

**The Bendheim Center for Finance
Princeton University**

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Princeton University





The
Bendheim
Center *for*
FINANCE



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Princeton University





CONTENTS



Director's Introduction	5
Faculty	11
Visiting Faculty	33
Visiting Fellows	36
Graduating Ph.D. Students	37
Finance Seminars	38
Civitas Foundation Finance Seminar Fall 2003	38
Civitas Foundation Finance Seminar Spring 2004	38
Conferences	39
The Princeton Lectures in Finance	39
Oxford-Princeton Workshop on Financial Mathematics & Stochastic Analysis	39
Energy Risk Conference	41
Political Economy of Financial Markets Conference	42
BCF Finance Industry Seminar Series	43
Undergraduate Certificate in Finance	45
Departmental Prizes, Honors and Athletic Awards to UCF '04 Students	46
Senior Theses of the Class of '04	47
Mini-Course on Financial Modeling, Valuation and Analysis Using Excel	49
Master in Finance	50
Admission Requirements	50
Statistics in the Admission Process	51
Program Requirements	51
Core Courses	52
Elective Courses	52
Tracks	55
Some Course Descriptions	56
Master in Finance Placement Record	59
Advisory Council	61
Corporate Affiliates Program	62
2004-05 Members	62
Levels and Benefits	62
Gift Opportunities	63
Acknowledgements 2003-04	64



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 new academic programs have been 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 a powerful 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 internships and longer-term 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 services as funding senior thesis projects, serving as a clearinghouse and major source of data, and providing expert faculty advisors.

Faculty

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 to 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 and psychology 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.

Thirty faculty members, representing six different departments, are currently affiliated with the BCF. Our newest hire is Alexandre d'Aspremont, who is joining our faculty this summer as an Assistant Professor in the Department of Operations Research and Financial Engineering. Professor d'Aspremont received his undergraduate degree from École Polytechnique in France in 1997 and his Ph.D. from Stanford University in 2003. His thesis was entitled "Shape Constrained Optimization, with Applications in Finance and Engineering." Before joining Princeton, he taught at Berkeley for one year. At Princeton, he will be teaching ORF 311: Optimization under Uncertainty and ORF 515: Asset Pricing II: Stochastic Calculus and Advanced Derivatives.

Undergraduate Certificate in Finance

Now in its sixth year, the Undergraduate Certificate in Finance continues to do extremely well. We enrolled 155 juniors from the Class of 2006, an increase from the numbers of the previous years (Class of '00: 61, '01: 82, '02: 85, '03: 122, '04: 135, '05: 141), bringing our total number of undergraduate students in the program (juniors and seniors) to 296 this year.

Students earning the UCF are drawn from a wide cross-section of departments on campus, testifying both to the interdisciplinary flavor of the program and its wide appeal. In addition, UCF students are an extremely talented subgroup of the already high-achieving Princeton classes. They continue to receive an extraordinary proportion of the prizes awarded by their respective departments. All together, in 2004, 71 UCF students or

63% of the 113 graduating certificate recipients received departmental prizes, honors, athletic awards or some combination of all three.

Four UCF students received a combination of departmental prizes and honors and athletic awards:

- John Paul Ference (Operations Research and Financial Engineering or ORFE): cum laude in ORFE, and Gordon Sykes Medal for light weight crew
- Elliot Holland (Civil and Environmental Engineering): Mack Angus Prize for best student in CEE, summa cum laude, and George J. Mueller Award for Athletics
- Brian Kirshbaum (Politics): cum laude in Politics, Gifford Trophy for Wrestling and Treide Trophy for Wrestling
- John Nuger (History): Joline Prize in American History and summa cum laude in History and Class of 1916 Athletic Award

Seventeen UCF students received departmental prizes and honors:

- Daniel Brand (Economics): Senior thesis prize in finance and magna cum laude in Economics
- Joanna Deitch (Economics): Senior thesis prize in finance and magna cum laude in Economics
- Jing Ge (Computer Science): Phillip Goldman '86 Prize in Computer Science and summa cum laude
- Benjamin Handel (Computer Science): Applied and Computational Mathematics Independent Project Prize, magna cum laude in Economics
- Philippe Inagaki (Physics): Allen Shenstone Prize in Physics and magna cum laude
- Robert Mulcare (Woodrow Wilson School): George Mitchell Scholarship and Lieutenant John Larkin Memorial Prize and summa cum laude in WWS
- Avinash Rao (ORFE): Kenneth Condit Prize and summa cum laude in ORFE
- Jonathan Sagal (Philosophy): Class of 1869 Prize in Ethics and summa cum laude
- Joshua Saltman (ORFE): Kenneth Condit Prize and summa cum laude in ORFE
- Austin Saypol (Economics): Wolf Balleisen Memorial Prize for best thesis, Halbert White '72 Prize for best Economics student and summa cum laude in Economics
- Parag Shah (Electrical Engineering): John Ogden Bigelow Prize in Electrical Engineering and cum laude in Electrical Engineering
- Adam Shukovsky (ORFE): Frank Castellana Prize in ORFE and summa cum laude in ORFE
- Anthony Sun (Electrical Engineering): David Forney Prize and summa cum laude in Electrical Engineering
- Brian Tsang (Computer Science): Accenture Prize, Phillip Goldman '86 Prize in Computer Science and James Hayes-Edgar Palmer Prize in Engineering (across entire Engineering) and summa cum laude
- Lauren Washychyn (Economics): Halbert White '72 Prize for best economics student and summa cum laude in Economics
- Amy Wu (Economics): Daniel Rubinfeld '67 Prize for best empirical thesis, cum laude in Economics
- Ashley Zohn (Sociology): Isidore Brown Academic Achievement Award and Isidore Brown Thesis Award and summa cum laude in Sociology

Five UCF students received athletic awards:

- Jonathan Kielizak (Electrical Engineering): Bonthron Trophy for Wrestling
- William Osnato (ORFE): George McFarland Squash Award
- George Pilcher (ORFE): Richard Colman-Scholar-Athlete Award
- Tim Releford (ORFE): Class of '52 Football Award
- Juan Valdivieso (Woodrow Wilson School): Dermot Quinn Memorial Swimming Award, War Memorial Trophy (Swimming) and member of 2004 Olympic Peruvian National Swim Team

Finally, 45 UCF students received some form of honors (23 cum laude, 14 magna cum laude and 8 summa cum laude).

Master in Finance

The second full class of the Center's Master in Finance (MFin) graduated in June 2004. 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.

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.

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. We intend to continue keeping the program small and selective.

MFin applications for 2004-05 continued at the high pace of approximately 200 applicants. We admitted 19 students this year, and 9 will be enrolling this coming fall. Our selectivity rate continues to be exceptionally high, with our program admitting less than 10% of its applicant pool. This is a substantially smaller percentage than our peer programs in quantitative finance (NYU, Columbia, Carnegie-Mellon, Berkeley, Chicago, etc.) and one that is comparable to the most selective business schools. Overall, this is a very good sign for the continued success of our program.

We have continued to conduct interviews of the most promising subset of our applicant pool using our Advisory Council. This process helps us to 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.

We have also continued to invest heavily in the placement of our graduating students. Our program has continued to enjoy excellent success with 100% of our graduates being placed in finance industry jobs or going on to Ph.D. programs. This year a three-day "boot camp" introductory program was developed for the incoming students prior to the beginning of classes in September. The camp focused 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 both the BCF faculty 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. As a result, we will be repeating the experiment in September 2004, with the "boot camp" likely to become a permanent fixture of the MFin program.

The networking efforts of our two dedicated placement advisors, the strong support from our Corporate Affiliates and Advisory Council, and the success enjoyed by our first two graduating classes have been reflected in a strong demand for our 2004 graduates, all of whom found permanent employment in top financial institutions at least six months before their graduation.

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. Eight students graduated in 2004. Our students continue to achieve high quality placements

which will further raise the visibility of the Center in the world of academic finance and industry.

- Dries Darius graduated from the Department of ORFE. His thesis “Optimal Investment under the Constant Elasticity of Variance Model” was written under the direction of Professor Ronnie Sircar. He will continue his career at Citigroup.
- Valdo Durrleman graduated from the Department of ORFE. His thesis deals with the relationships between implied and spot volatilities and was written under the supervision of Professor René Carmona. He will be pursuing his career at Stanford University as a Szegő Assistant Professor in the mathematics department.
- Aytac Ilhan graduated from the Department of ORFE. Her thesis deals with hedging exotic options in incomplete markets and was written under the supervision of Professor Ronnie Sircar. She will be pursuing her academic career as a post-doctorate fellow at Oxford University.
- Umit Kaya graduated from the Department of Economics. His thesis deals with corporate governance and was written under the supervision of Professor Patrick Bolton. He will be pursuing his career as a consultant working for Mercer, Oliver, Wyman.
- Bruce Preston received his Ph.D. from the Department of Economics. His thesis “Adaptive Learning and the Use of Forecasts in Monetary Policy” was written under the supervision of Professors Jonathan Parker and Michael Woodford. He is now an Assistant Professor at Columbia University in the Economics Department.
- Adam Purzitsky graduated from the Department of Economics. His thesis deals with jump-diffusion and random field models of the term structure of interest rates and was written under my supervision. He will begin a career in fixed income research at Lehman Brothers.
- Koray D. Simsek graduated from the Department of ORFE. His thesis deals with applications of stochastic programming in multi-stage financial planning and was written under the supervision of Professor John Mulvey. He will be pursuing his career as an Associate Professor at EDHEC Business School in Nice, France.
- Jialin Yu graduated from the Department of Economics. His thesis deals with financial econometrics and applications to the exchange rate in China and robust financial decision making. It was written under my supervision. He will be pursuing his career as an Assistant Professor in the finance department at the Graduate School of Business at Columbia University.

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.

With the improving economy, our Corporate Affiliates Program has 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 2004-05 are the Citadel Investments Group, Citigroup, Deutsche Bank, Goldman Sachs, JP Morgan Chase, Lehman Brothers, Merrill Lynch, Moody’s Corporation and Morgan Stanley.

Advisory Council

The Center relies on the help and advice of prominent alumni working in the financial sector. The sixth annual meeting of the Advisory Council took place on campus on May 13, 2004. The agenda was centered on the placement of future Master students, 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, by encouraging and supporting the work of existing faculty, and by bringing to campus outstanding scholars and practitioners from private industry, 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 Aït-Sahalia

Otto A. Hack '03 Professor of Finance and Economics
Director, Bendheim Center for Finance
August 2004



FACULTY

Dilip Abreu is a 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.

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”

Representative publications:

- “Evolutionary Stability in a Reputational Model of Bargaining,” *Games and Economic Behavior*, forthcoming (with R. Sethi).
- “Bubbles and Crashes,” *Econometrica*, 71 (1), 173-204, January 2003 (with M. Brunnermeier).
- “Synchronization Risk and Delayed Arbitrage,” *Journal of Financial Economics*, 66, 341-360, December 2002 (with M. Brunnermeier).
- “Bargaining and Reputation,” *Econometrica*, 68 (1), 85-117, January 2000 (with F. Gul).
- “On the Theory of Infinitely Repeated Games with Discounting,” *Econometrica*, 56 (2), 383-396, March 1988.

Yacine Aït-Sahalia is the Otto A. Hack '03 Professor of Finance and Economics and the Director of the Bendheim Center for Finance 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 Institute of Mathematical Statistics, and a Research Associate for the National Bureau of Economic Research. He currently serves 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: Topics in Financial Economics

Graduate students advised:

- Adam Purzitsky, “Empirical Issues in Modeling the Term Structure”
- Jialin Yu, “Saddlepoint Methods in Finance”

Representative publications:

- “Estimators of Diffusions with Randomly Spaced Discrete Observations: A General Theory,” *Annals of Statistics*, 2004 (with P. Mykland).
- “Disentangling Diffusions from Jumps,” *Journal of Financial Economics*, 2004.

- “The Effects of Random and Discrete Sampling When Estimating Continuous-time Diffusions,” *Econometrica*, 2003 (with P. Mykland).
- “Maximum-likelihood Estimation of Discretely-sampled Diffusions: A Closed-form Approximation Approach,” *Econometrica*, 2002.
- “Telling from Discrete Data Whether the Underlying Continuous-time Model is a Diffusion,” *Journal of Finance*, 2002.

Ben S. Bernanke taught at the Stanford Graduate School of Business before coming to Princeton in 1985. He is currently on leave from his position as the Howard Harrison and Gabrielle Snyder Beck Professor of Economics and Public Affairs. His research focuses primarily on monetary policy, the role of financial markets in the macroeconomy, and economic history. Bernanke is a Fellow of the Econometric Society, a Fellow of the American Academy of Arts and Sciences, a Research Associate of the National Bureau of Economic Research, and a Guggenheim Fellow. Ben took the oath of office as a member of the Board of Governors of the Federal Reserve System in August 2002. He is the editor of the *American Economic Review*. He earned his Ph.D. from the Massachusetts Institute of Technology in 1979.

Representative publications:

- “Is Growth Exogenous? Taking Mankiw, Romer, and Weil Seriously,” in *NBER Macroeconomics Annual*, 2001 (with R. Gurkaynak).
- “Should Central Banks Respond to Movements in Asset Prices?” *American Economic Review*, May 2001 (with M. Gertler).
- *Essays on the Great Depression*, Princeton: Princeton University Press, 2000.
- “Measuring Monetary Policy,” *Quarterly Journal of Economics*, 113(3), 869-902, August 1998 (with I. Mihov).
- *Inflation Targeting: Lessons from the International Experience*, Princeton: Princeton University Press, 1998 (with T. Laubach, F. Mishkin, and A. Posen).

Swati Bhatt has been at Princeton since September 1992, teaching at the Woodrow Wilson School and in the Department of Economics. She obtained her Ph.D. in Economics from Princeton University in 1986 and worked as a research economist at the Federal Reserve Bank of New York until 1990. She then taught at the Stern School of Business prior to joining Princeton. She is currently Director of Student Programs (undergraduate and graduate) at the Bendheim Center and Lecturer, Woodrow Wilson School of Public and International Affairs. Her research interests center on empirical corporate finance, venture capital and the entrepreneurship process.

Courses taught:

- ECO 320: Financial Derivatives and Arbitrage
- WWS 582: Topics in Financial Markets

Undergraduate students advised:

- Joseph Looke, “Entrepreneurism Corrupted: An Analysis of the Fall of Enron”
- James Tieng, “Reforming the Boardroom: Sarbanes-Oxley, Board Independence and Firm Performance”
- Amy Wu, “The Periodic Term Structure in an Enhanced Index Fund and Its Implications for Market Efficiency” (awarded the prize for best empirical economics thesis in 2004)

David Blair is Director of Corporate Relations for the Bendheim Center for Finance. Previously 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) 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, iii) facilitating the recruiting activities of Corporate Affiliates by coordinating on-campus recruiting presentations and organization of events at the Bendheim Center and iv) developing and teaching a special seminar in applied finance. He received his undergraduate degree from Princeton and graduate degrees in law and business from Columbia University.

Course taught:

- Freshman Seminar FRS 130: Modern Financial Markets

Undergraduate students advised:

- Alidia Clagett, “Bubble, Bubble, Toil and Trouble: An Analysis of the Stock Market Bubbles of 1929, 1966-69, and 2000”
- Jeffrey A. Micsky, “Primary Market Pricing of High Yield Debt in a Recessionary Environment”
- Gianfranco Tripiccio, “The Effects of Mortgage Convexity Hedging on Long Term Interest Rates”

Alan Blinder is the Gordon S. Rentschler Memorial Professor of Economics. He is also the 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 a partner in the Promontory Financial Group, Vice Chairman of the G7 Group, a Trustee of the Russell Sage Foundation, 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: The National Economy
- WWS 593a: The Political Economy of Central Banking

Representative publications:

- “What Does the Public Know about Economic Policy, and How Does It Know It?” *Brookings Papers on Economic Activity* 1: 2004 (with A. Krueger).
- *The Quiet Revolution: Central Banking Goes Modern*, Yale University Press, 2003.
- *Downsizing in America*, Russell Sage Foundation, 2003 (with W. Baumol and E. Wolff).
- *The Fabulous Decade: Macroeconomic Lessons from the 1990s*, The Century Fund, 2001 (with J. Yellen).
- *How Do Central Banks Talk?*, *Geneva Report on the World Economy* No. 3, International Center for Monetary and Banking Studies, 2001 (with C. Goodhart, P. Hildebrand, D. Lipton, and C. Wyplosz).

Patrick Bolton is the John H. Scully '66 Professor of Finance and Economics at Princeton University. Professor Bolton has both a Ph.D. in Economics and an M.Sc. in Mathematical Economics and Econometrics from the London School of Economics. He is a Fellow of the Econometric Society, and a Fellow of CEPR, ECGI and NBER. He is a member of the Editorial Board of the *Journal of Financial Intermediation*, and a previous member of the Editorial Boards of *Econometrica*, *Annales d'Economie et de Statistique and Economic Policy*. He is a managing editor of the *Journal of the European Economic Association (JEEA)* and a former Managing Editor of the *Berkeley Electronic Journals in Theoretical Economics* and the *Review of Economic Studies*. Professor Bolton's main research interests are in contact theory, corporate finance, political economy and industrial organization.

Courses taught:

- ECO 526/FIN 596: Financial Economics II
- ECO 541: Industrial Organization and Public Policy
- ECO 542: Regulation of Industry and Antitrust Policy

Undergraduate students advised:

- Stephen Fleming, "Research and Development during the Technology Boom of the Late 1990s: Does the Source of Financing Matter?"
- Jordan Sinclair, "Deriving Order from Chaos: A Study in Technical Trading"
- Joseph Stabler, "Shareholder Democracy: Plurality Voting, Board Representation, and Access to the Corporate Ballot"

Graduate students advised:

- Sylvain Champonnois
- Wioletta Dziuda
- Andrei Hagiu, "Platforms, Pricing, Commitment and Variety in Two-Sided Markets"
- Umit Kaya
- Marc Martos-Vila
- Chunhui Miao
- Elod Takats
- Jeongson Yun

Representative publications:

- "Corporate Governance and Control," in the *Handbook of the Economics of Finance*, edited by George Constantinides, Milton Harris and René Stulz, North-Holland, 2003 (with M. Becht and A. Roell).
- "Towards a Statutory Approach to Sovereign Debt Restructuring: Lessons from Corporate Bankruptcy Practice around the World," *IMF Staff Papers*, 2003.
- "Incomplete Social Contracts," with Philippe Aghion, *Journal of the European Economic Association*, 1, 38-67, 2003.
- "The Great Divide and Beyond: Financial Architecture in Transition," *Journal of Economic Perspectives*, 16(1), winter 2002 (with E. Berglof).
- "Political Intervention in Debt Contracts," *Journal of Political Economy*, 110, 1103-34, October 2002 (with H. Rosenthal).

Markus Brunnermeier is an Assistant Professor in the Department of Economics and member of Princeton's Bendheim Center for Finance and the International Economics Section. He was awarded his Ph.D. by the London School of Economics, where he was also affiliated with its Financial Markets Group. His research focuses on stock market bubbles, limits to arbitrage, financial and liquidity crisis, as well as behavioral economics. He shows that bubbles persist since sophisticated traders prefer to ride a stock market bubble rather than to attack it. In his work on financial crisis and risk management, he shows that "predatory trading" exacerbates a liquidity crisis and can cause systemic risk. His current research proposes a shift away from the rational expectations paradigm towards "optimal expectations." His research won him a spot on the prestigious Review of Economic Studies Lecture Tour in 1999 and has been supported by grants from the National Science Foundation, the European Union, Economic & Social Research Council, and *Economica*.

Course taught:

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

Representative publications:

- "Information Leakage and Market Efficiency," *Review of Financial Studies*, forthcoming.
- "Predatory Trading," *Journal of Finance*, forthcoming (with L. Pedersen).
- "Hedge Funds and the Technology Bubble," *Journal of Finance*, 59(5), 2007-2034, 2004 (with S. Nagel).
- "Learning to Re-optimize Consumption at New Income Levels: A Rationale for Prospect Theory," *Journal of European Economic Association*, 2(1), 98-114, 2004.
- "Bubbles and Crashes," *Econometrica*, 71(1), 173-204, 2003 (with D. Abreu).

René Carmona, Paul 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 American Mathematical Society, the Society for Industrial and Applied Mathematics and the Institute of Mathematical Statistics. His research interests center on stochastic partial differential equations, statistical analysis of financial data, pricing in incomplete markets, weather derivatives, and energy trading and risk management.

Courses taught:

- ORF 505/FIN 505: Regression and Time Series
- ORF 531/FIN 531: Computational Finance in C++
- ORF 557: Malliavin Calculus and Applications to Finance
- ORF 574: Special Topics in Investment Science

Undergraduate students advised:

- Kelly Gaydos
- Katherine Milkman
- Alison Weingarden

Graduate students advised:

- Albina Danilova, "Indifference Pricing for Weather Derivatives"
- Valdo Durrleman, "Pricing Spreads"

- Nihil Patel
- Vincent Samat
- Mike Ludkovski, “Convenience Yield: Estimation and Model Calibration”
- Lixin Wang, “Applications of the Malliavin Calculus to the Analysis of Stochastic Partial Differential Equations”

Representative publications:

- “Pricing and Hedging Spread Options,” *SIAM Review*, forthcoming (with V. Durrleman).
- “A Characterization of Hedging Portfolios for Interest Rate Contingent Claims,” *Annals of Applied Probability*, forthcoming (with M. Tehranchi).
- “Interest Rate Models: From Parametric Statistics to Infinite Dimensional Stochastic Analysis,” *SIAM*, Philadelphia, forthcoming.
- *Statistical Analysis of Financial Data in Splus*.

Patrick Cheridito received his Ph.D. from ETH Zurich (Switzerland) in 2001 and visited universities in Vienna (Austria), Paris (France), Barcelona (Spain) and Pisa (Italy) in the academic year 2001-02, before visiting the BCF in 2002-03. Since September 2003 he is 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 (ETH, Zurich, Switzerland) and Robert Kimmel (Bendheim Center) he worked on affine models for interest rates. With Mete Soner (Koc University in Istanbul, Turkey) and Nizar Touzi (Crest in Paris, France) he studied the problem of hedging contingent claims under gamma constraints. With Freddy Delbaen and Michael Kupper (both ETH Zurich, Switzerland) he studied dynamic risk measures.

Courses taught:

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

Undergraduate students advised:

- Hendrik Chasse, “Hedge Funds: When and Where to Invest”
- Melissa Maquilan, “An Analysis of Expected Shortfall as a Method of Measuring Risk in Credit Portfolios”
- Adam Shukovsky, “Hedging European Options in the Presence of Transaction Costs”

Graduate students advised:

- Jaewon Choi, “Credit Risk Model with Lagged Information on the Firm”

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. 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*, *MOCTMOST*, 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 as a constrained maximization problem to be solved by the method of Lagrange multipliers (in lieu of the method 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:

- ECO 340: The Chinese Economy

Representative publications:

- *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).
- *China’s Economic Transformation*. Oxford: Blackwell Publishers, 2002.
- “Equity Premium and Consumption Sensitivity when the Consumer-investor Allows for Unfavorable Circumstances,” *Journal of Economic Dynamics and Control*, 26(9-10), 1417-1429, August 2002 (with L. Zheng).
- “Accounting for Economic Growth in Taiwan and Mainland China: A Comparative Analysis,” *Journal of Comparative Economics*, 507-530, September 2002 (with A. Lin).

Erhan Çinlar first came to Princeton University as a Visiting Professor of Statistics in 1979-80. He is currently the Chair of Operations Research and Financial Engineering and also holds the Norman J. Sollenberger Professor of Engineering chair. 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

Undergraduate students advised:

- Warren Cheng, “Identifying Inefficiencies in Current Methods of Determining Baseball Contracts”
- Avinash Rao, “Credit Risk Extensions to the Markovian Model”

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).



Savas Dayanik joined Princeton's ORFE Department in September 2002. His research interests center on applied probability, stochastic processes and modeling, optimal stopping, optimal stochastic control with applications to finance, investment decision analysis and operations management. He received his Ph.D. from Columbia University in 2002 in Operations Research with concentration in Applied Probability. He received the first prize in the INFORMS 2002 George E. Nicholson Student Paper Competition in November 2002. He is a member of Institute for Operations Research and the Management Sciences (INFORMS), Society for Industrial and Applied Mathematics (SIAM), and Institute of Mathematical Statistics (IMS).

Courses taught:

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

Undergraduate students advised:

- Kevin Foster, "Your Team is Going Broke! Now Switch to Variable Ticket Pricing. An Analysis of N.B.A. Game Attendance to be Used with Revenue Management Techniques"
- Nada Siddiqui, "Re-engineering Portfolio Theory: Optimizing the Diversification of Moët 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
- Kinga Elo (Visiting Student Research Collaborator)
- Semih S. Sezer

Representative publications:

- "The Effectiveness of Several Performance Bounds for Capacitated Production, Partial-order-service Assemble-to-order Systems," *Manufacturing and Service Operations Management*, 5, 230-251, 2003 (with J. Song and S. Xu).
- "On the Optimal Stopping Problem for One-dimensional Diffusions," *Stochastic Processes and their Applications*, 107(2), 173-212, 2003 (with I. Karatzas).
- "An Adaptive Bayesian Replacement Policy with Minimal Repair," *Operations Research*, 50(3), 552-558, 2002 (with U. Gurler).

Jianqing Fan is Professor of Operations Research and Financial Engineering since the fall of 2003. A specialist in statistics, he served as a faculty member at the University of North Carolina, University of California at Los Angeles, and the Chinese University of Hong Kong over the last 14 years. He also was chair of the statistics department of the Chinese University, where he received teaching awards in 2001 and 2002. In addition, Professor Fan received the 2000 President's Award from the Committee of Presidents of Statistical Societies, recognizing the most outstanding statistician under age 40. He is an elected member of the International Statistical Institute and an elected Fellow of the Institute of Mathematical Statistics and the American Statistical Association. He served on the board of the International Chinese Statistical Association from 2000 to 2002, and the Council of the Institute of Mathematical Statistics from 2003 to 2005. He is one of the top 10 highly cited researchers in mathematical sciences between 1991-2001 and 1993-2003, according to *Science Watch*. He coauthored three books. He serves as the editor of *The Annals of Statistics*, and *Probability Theory and Related Fields*, and as an Associate

Editor of the *Journal of the American Statistical Association*. He has served as an Editor of *Journal of Multivariate Analysis* (1998-2000), and an Associate Editor of *The Annals of Statistics* (1998-2002) and *Statistica Sinica* (1996-2002). He earned his bachelor's degree from Fudan University in China, his master's degree from Academia Sinica in China, and his doctoral degree from the University of California at Berkeley. His research interests are financial econometrics, risk management, computational biology, nonlinear time series, high-dimensional data analyses, likelihood theory, nonparametric tests, generalized linear models, analysis of longitudinal data, and model selections.

Courses taught:

- ORF 569/FIN 569: Statistical Theory and Methods
- ORF 504/FIN 504: Financial Econometrics

Representative publications:

- "A Re-examination of Stanton's Diffusion Estimations with Applications to Financial Model Validation," *Journal of American Statistical Association*, 98, 118-134, 2004 (with C. Zhang).
- "On Non-concave Penalized Likelihood with Diverging Number of Parameters," *The Annals of Statistics*, 32, 928-961, 2004 (with H. Peng).
- *Nonlinear Time Series: Nonparametric and Parametric Methods*, 570pp, Springer-Verlag, New York. Figures and Computer Programs, 2003 (with Q. Yao).
- "Time-dependent Diffusion Models for Term Structure Dynamics and the Stock Price Volatility," *Statistica Sinica*, 13, 965-992, 2003 (with J. Jiang, C. Zhang, and Z. Zhou).
- *Local Polynomial Modeling and Its Applications*, 341pp, Chapman and Hall, London, 1996 (with I. Gijbels).

Victoria Henderson is an Assistant Professor in the Department of Operations Research and Financial Engineering. She received her Ph.D. from the University of Bath in 1999 and has since held research positions at ETH Zurich, Warwick Business School and the University of Oxford. Her research interests are in the area of derivatives, including incomplete markets, non-traded assets, real options, executive stock options, and exotic options. She is also interested in optimal portfolio choice problems.

Courses taught:

- ORF 555: Fixed Income Models
- FIN 503/ORF 515: Asset Pricing II: Stochastic Calculus and Advanced Derivatives

Undergraduate students advised:

- Kate Barber, "A Rounding Model for Option Pricing"
- Michelle Breyer, "Extendible Options: Pricing and Analysis"
- Nimish Jain, "Real Options: A Comparative Evaluation of Existing Models"

Graduate student advised:

- Milda Darguzaitė

Representative publications:

- "On the Equivalence of Floating and Fixed-strike Asian Options," *Journal of Applied Probability*, 39(2), June 2002 (with R. Wojakowski).
- "Valuation of Claims on Non-traded Assets using Utility Maximization," *Mathematical Finance*, 12(4), 351-373, October 2002.

- "Local Time, Coupling and the Passport Option," *Finance and Stochastics*, 4(1), 69-80, January 2000 (with D. Hobson).

Harrison Hong joined Princeton in 2003 as a Professor of Economics and Finance after having spent the year visiting us from the Graduate School of Business at Stanford University. Harrison's interests focus on behavioral finance, asset pricing with differences of opinion and short-sales constraints, asset pricing with market imperfections, career concerns and herding, social interaction and investor behavior in stock markets, and mutual funds. He is a member of the American Economic Association, American Finance Association, and the Western Finance Association. He received his Ph.D. from the Massachusetts Institute of Technology in 1997.

Courses taught:

- ECO 415/FIN 515: Portfolio Theory and Asset Management
- ECO 525: Financial Economics I

Undergraduate students advised:

- Kevin Crowe, Jr., "The Emergence of an Asset Class: An Empirical Analysis of Private Equity Performance"
- Donald Komorous, "The Stock Split Anomaly: An Analysis of Underreaction to Stock Splits"
- Lauren Washychyn, "Does Expensing Stock Options Cause Share Prices to Decline?"
- Scott Willig, "Dividend Taxation and Market Valuation"

Representative publications:

- "Bad News Travels Slowly: Size, Analyst Coverage, and the Profitability of Momentum Strategies," *Journal of Finance*, February 2000.
- "Security Analyst Career Concerns and Herding of Earnings Forecasts," *Rand Journal of Economics*, Spring 2000.
- "A Model of Returns and Trading in Futures Markets," *Journal of Finance*, April 2000.
- "A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets," *Journal of Finance*, December 1999.

Daniel Kahneman is the Eugene Higgins Professor of Psychology and Professor of Public Affairs in the Woodrow Wilson School since 1993. He is the co-recipient of the 2002 Nobel Prize in Economic Sciences. He is a member of the National Academy of Sciences, and in 2002 received (together with his late colleague Amos Tversky) the prestigious Grawemeyer Award in Psychology. He is a Fellow of the American Academy of Arts and Sciences, the Econometric Society, the American Psychological Association and the Canadian Psychological Association. He is currently on the Editorial Boards of the *Journal of Behavioral Decision Making*, *Thinking and Reasoning*, and *Economics and Philosophy*. He received his Ph.D. in 1961 from the University of California.

Courses taught:

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

Representative publications:

- *Choices, Values and Frames*, New York: Cambridge University Press and the Russell Sage Foundation, summer 2000 (with A. Tversky).

- “Economic Preferences or Attitude Expressions? An Analysis of Dollar Responses to Public Issues,” *Journal of Risk and Uncertainty*, 19, 220-242, 1999.
- *Well-Being: Foundations of Hedonic Psychology*, Russell Sage Foundation Press: New York, 1999 (ed. with E. Diener and N. Schwarz).
- “Does Living in California Make People Happy? A Focusing Illusion in Judgments of Life Satisfaction,” *Psychological Science*, 9, 340-346, 1998 (with D. Schkade).
- “Aspects of Investor Psychology,” *The Journal of Portfolio Management*, 24, 52-65, 1998 (with M. Riepe).

Robert Kimmel received his Ph.D. in Finance from the University of Chicago, Graduate School of Business in 2001. Prior to that, he also received an M.B.A. from the University of Chicago, Graduate School of Business, concentrating in Analytic Finance and Econometrics; an M.S. in Computer Science from Columbia University; and a B.S.E. in Computer Science and Engineering from the University of Pennsylvania. His research interests are focused mainly on new approaches to term structure modeling and estimation of continuous time stochastic processes.

Courses taught:

- ECO 415/FIN 515: Portfolio Theory and Asset Management
- ECO 421/FIN 521: Fixed Income Models and Applications
- FIN 502: Corporate Finance and Financial Accounting

Representative publications:

- “Modeling the Term Structure of Interest Rates: A New Approach,” *Journal of Financial Economics*, 2004.

Paul Krugman is the author or editor of dozens of books and several hundred articles, primarily about international trade and international finance. Krugman 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. Krugman 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.
- *The Return of Depression Economics*, Norton, 1999.
- *The Spatial Economy*, MIT Press, 1999 (with M. Fujita and A. Venables).

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 317: Financial Markets

Undergraduate students advised:

- Joanna Deitch, “Defining the Concept of the Value Stock: Book-to-market versus Price-to-earning, Dividend Yield, and Earnings Growth”

Representative publications:

- *A Random Walk Down Wall Street*, W. W. Norton & Co., New York, 1999; 8th edition paperback, January 2004.
- “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]
- “The Growth of Index Funds and the Pricing of Equity Securities,” *Journal of Portfolio Management*, 27(2), winter 2001 (with A. Radisich). [Best Article for the Third Annual Bernstein Fabozzi/Jacobs Levy Awards]
- *Global Bargain Hunting: The Investor’s Guide to Profits in Emerging Markets*, New York: Simon & Schuster, January 1998 (with J. Mei).

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 523: Nonlinear Programming
- ORF 574: Special Topics: Hedge Funds
- ORF 311: Optimization Under Uncertainty
- WWS 514: Financial Planning Models

Undergraduate students advised:

- Avery Kiser
- Suzanna Sanchez
- Vippy Wong

Graduate students advised:

- Batur Bicer, “Modeling Synthetic Organizations via Financial Engineering”
- Hafize Erkan, “Decentralized Risk Management for Global Financial Companies”
- Ozughan Karakas, “Volatility Strategies for Hedge Funds”
- Koray Simsek, “Integrating Pension and Financial Planning”
- Jamey Thompson, “Optimizing Non-parametric Models for Hedge Funds”
- Cenk Ural, “Applying Stochastic Optimization for Statistical Arbitrage Investment Strategies”
- Z. Zhang, “Stochastic Programming Models for Rebalancing Investment Portfolios”

Representative publications:

- “Evaluating a Trend Following Commodity Index for Multi-period Asset Allocation,” *Journal of Alternative*

Investments, summer 2004.

- “The Role of Hedge Funds for Long Term Investors,” *Journal of Financial Transformations*, spring 2004.
- “Advantages of Multi-period Portfolio Models,” *Journal of Portfolio Management*, winter 2003.
- “A Stochastic Network Approach for Integrating Pension and Corporate Financial Planning,” *Innovations in Financial and Economic Networks*, 2003.
- “Trend-following Hedge Funds and Multi-period Asset Allocation,” *Quantitative Finance*, 2002.

Jonathan A. Parker is an Assistant Professor of Economics and Public Affairs at Princeton University where he is affiliated with the Department of Economics, the Bendheim Center for Finance, and the Woodrow Wilson School of Public and International Affairs. Dr. Parker received his Ph.D. in Economics from the Massachusetts Institute of Technology where he was awarded the Robert Solow Endowment Prize for excellence in research and teaching. Prior to his present position at Princeton, Dr. Parker held positions at the University of Michigan Business School, where he was a Society of Scholars Fellow, and at the Department of Economics at the University of Wisconsin, where he was the Maude P. and Milton J. Shoemaker Fellow. Since coming to Princeton, Professor Parker has been named an Alfred P. Sloan Research Fellow and a National Bureau of Economic Research Aging and Health Economics Fellow, and his research has received support from the National Science Foundation and the Sloan Foundation. He is also a National Bureau of Economic Research Faculty Research Fellow, an Associate Editor for the *Journal of Money, Credit and Banking*, and a member of the American Economic Association and Econometric Society. Professor Parker teaches macroeconomics, and his research has focused on the risk of the stock market, optimism and portfolio choice, taxation and consumer spending, national saving, income risk and consumer demand, corporate profit taxes and investment, and how wages adjust in recessions.

Courses taught:

- ECO 503: Macroeconomic Theory I
- ECO 521: Advanced Macroeconomics I
- ECO 562: Topics in Development
- WWS 512c: Macroeconomic Analysis Advanced

Representative publications:

- “Luxury Goods and the Equity Premium,” *Journal of Finance*, December 2004 (with Y. Ait-Sahalia and M. Yogo).
- “Consumption Over the Life Cycle,” *Econometrica*, 70(1), 47-89, January 2002 (with P. Gourinchas).
- “The Consumption Risk of the Stock Market,” *Brookings Papers on Economic Activity*, 2, 279-348, 2001.
- “Spendthrift in America? On Two Decades of Decline in the U.S. Saving Rate,” in B. Bernanke and J. Rotemberg, eds., *NBER Macroeconomics Annual*, 317-70, 1999.
- “The Reaction of Household Consumption to Predictable Changes in Social Security Taxes,” *American Economic Review*, 89(4), 959-973, September 1999.

Hélène Rey received her Ph.D. from the London School of Economics and from the École des Hautes Études en Sciences Sociales in 1998. She first came to Princeton as a Visiting Scholar in April 1998; she returned in 2000 as an Assistant Professor. She is currently a Faculty Research Fellow in International Finance and Macroeconomics for the National Bureau of Economic Research. She is also a Research Affiliate in International Macroeconomics for the Centre for Economic Policy Research. She is Associate Editor of the *Journal of the European Economic Association* and of the *Economic Journal*. Her research interests focus mainly on international capital flows, exchange rates and financial crises.

Courses taught:

- WWS 544: International Macroeconomics
- ECO 553: International Monetary Theory and Policy II

Undergraduate students advised:

- Kenneth Chu, “A Tiger Chasing a Dragon: Corporate Governance in China and India”
- Peter Cioni, “Equity Buybacks and the Benefits for Uninformed Investors”
- Mary Hogan, “Retail: The Missing Piece?”
- Crystal Jiang, “The Problem of Debt: An Empirical Analysis of the Effect of Collective Action Clauses on Emerging Market Bond Yield Spreads”
- Emily Kroshus, “Residual Effects of Abortion Consideration during Pregnancy, at Birth and at One Year Specifically with Respect to Maternal Smoking”
- George Pilcher, “Fortifying Latin-American Economies for the 21st Century”
- Jean Poster, “Offshore Financial Centers: Bane or Benefit”
- Kate Reid, “Microfinance for Macrofeminism”
- John Robinson, “A Determination of the Potential Effects of School Size on Student Achievement and School Spending”

Graduate students advised:

- Deniz Igan
- Alejandro Justiniano
- Jordi Mondria
- Thomas Wu

Representative publications:

- “Financial Supermarkets: Size Matters for Asset Trade,” *Journal of International Economics*, forthcoming (with P. Martin).
- “Determinants of Cross Border Equity Transaction Flows,” *Journal of International Economics*, forthcoming (with R. Portes).
- “Can Portfolio Rebalancing Explain the Dynamics of Equity Returns, Equity Flows, and Exchange Rates?” *American Economic Review*, P&P, May 2004.
- “Exchange Rates, Equity Prices and Capital Flows,” NBER Working Paper 9398, CEPR DP 3735, 2002 (with H. Hau).
- “International Trade and Currency Exchange,” *Review of Economic Studies*, 68(2), April 2001.

Ailsa Roell has been a Senior Research Economist in the Department of Economics at Princeton University since 1997. She received her Ph.D. in Political Economics from Johns Hopkins University. She was a postdoctoral associate at the Massachusetts Institute of Technology, a lecturer in economics at the London School of Economics, a chercheur FNRS and chargée de cours at Université Libre de Bruxelles, and a professor of finance at Tilburg University. She was awarded the BACOB prize for European research in finance (joint with Marco Pagano) in 1997. Her current research interests are the competition among exchanges in attracting listings and liquidity, and corporate governance issues.

Courses taught:

- ECO 412: Trading and Securities Markets
- ECO 416: Topics in Corporate Finance, Corporate Governance and Banking



Undergraduate students advised:

- Daniel Brand, “The Method of Payment in Mergers & Acquisitions: Determinants and Stock Price Impact”
- Christopher Jaeger, “Net Asset Value Predictability: The Stale-price Arbitrage of Open-end Mutual Funds”
- Katherine Kuga, “The Effects of Various Macroeconomic Variables on the Stock Market”
- Joy Nims, “Executive Compensation & Earnings Restatements: An Unintended Consequence of Equity-based Pay”

Representative publications:

- “Market Making with Costly Monitoring: An Analysis of the SOES Controversy,” *Review of Financial Studies*, 2003 (with T. Foucault and P. Sandas).
- “Corporate Governance and Control,” in G. Constantinides, M. Harris and R. Stulz (eds.), *Handbook of the Economics of Finance*, North-Holland 2003 (co-authored with M. Becht and P. Bolton).
- “The Geography of Equity Listing: Why Do European Companies List Abroad?” *Journal of Finance*, 57(6), December 2002 (with M. Pagano and J. Zechner).
- “The Choice of Stock Ownership Structure: Agency Costs, Monitoring and Liquidity,” *Quarterly Journal of Economics*, 1998 (with M. Pagano).
- “Blockholdings in Europe: An International Comparison,” *European Economic Review*, 1999 (with M. Becht).

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. Scheinkman is 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. From 1973 to 1998 he 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, Scheinkman was Vice President of the Financial Strategies Group at Goldman, Sachs & Co. He has been a visiting professor at 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, Scheinkman held a Blaise Pascal Research Chair (France). His current research interests are the study of asset-price bubbles, developing tools for empirical studies of asset markets, and the economics of social interactions.

Course taught:

- ECO 346: Latin American Economics
- ECO 502: Microeconomic Theory
- ECO 525/FIN 595: Finance Theory I
- ECO 526: Finance Theory II

Representative publications:

- “Overconfidence and Speculative Bubbles,” *Journal of Political Economy*, December 2003, 1183-1219 (with W. Xiong).
- “Non-market Interactions,” in *Advances in Economics and Econometrics: Theory and Applications*, Eighth World Congress, M. Dewatripont, L. P. Hansen, and S. Turnovsky (eds.), Cambridge University Press, 2002 (with E. Glaeser).
- “Financial Intermediation without Exclusivity,” *American Economic Review*, May 2001 (with T. Santos).
- “Measuring Social Interactions,” in *Social Dynamics*, S. Durlauf and P. Young, (eds.), MIT Press, Cambridge, 2001 (with E. Glaeser).
- “Competition among Exchanges,” *Quarterly Journal of Economics*, August 2001, 1027-1062 (with T. Santos).

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:

- “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).
- “What Does Monetary Policy Do?,” *Brookings Papers on Economic Activity*, 2, 1-63, 1996 (with E. Leeper and T. Zha).

K. 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 ORFE Department as an Assistant Professor. He became an Associate Professor in July 2004. He has been the recipient of National Science Foundation research grants during the period 1998-present. He was a first-time recipient of the E-Council Excellence in Teaching Award for his teaching spring term 2002 and the Howard B. Wentz Jr. Junior Faculty Award in 2003. His research interests center on stochastic models in finance, particularly for market volatility; optimal control in incomplete markets; employee stock options; market microstructure models and long-range dependence in financial time series.

Courses taught:

- ORF 335/ECO 335: Introduction to Financial Engineering
- ORF 512: Stochastic Modeling
- ORF 515: Stochastic Calculus for Finance & Engineering
- ORF 575: Financial Engineering Seminar: Computational Finance

Graduate students advised:

- Dries Darius
- Aytac Ilhan
- Gokce Ozcan
- Evangelos Papageorgiou
- Antoine Toussaint

Representative publications:

- “Stochastic Volatility Corrections for Interest Rate Derivatives,” *Mathematical Finance*, 14(2), April 2004 (with P. Cotton, J.-P. Fouque and G. Papanicolaou).
- “Singular Perturbations in Option Pricing,” *SIAM Journal on Applied Mathematics*, 63(5), 2003 (with J.-P. Fouque, G. Papanicolaou and K. Solna).
- “Trend-following Hedge Funds and Multi-period Asset Allocation,” *Quantitative Finance*, 2(5), October 2002 (with D. Darius, A. Ilhan, J. Mulvey and K. Simsek).

- “Partial Hedging in a Stochastic Volatility Environment,” *Mathematical Finance*, 12(4), October 2002 (with M. Jonsson).
- *Derivatives in Financial Markets with Stochastic Volatility*, Cambridge University Press, 2000 (with J.-P. Fouque and G. Papanicolaou).

Kenneth Steiglitz received his doctorate in 1963 from New York University and has been teaching at Princeton ever since. He was promoted to Associate Professor in 1967 and Professor in 1973. He is a Fellow of the IEEE (1981), a Fellow of the ACM (1997) and has been awarded 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 research interests are in agent-based modeling of markets and auctions, and in computing using soliton collisions.

Courses taught:

- COS 323: Computing for the Physical and Social Sciences
- COS 444: Electronic Auctions
- COS 576: Nonstandard Computation

Undergraduate students advised:

- Eric Tonkyn, “Empirical Analysis of Sniping on eBay”

Representative publications:

- “Frugality in Path Auctions,” ACM-SIAM Symposium on Discrete Algorithms (SODA), New Orleans, January 11-13, 2004 (with E. Elkind and A. Sahai).
- “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).
- “Collisions of Two Solitons in an Arbitrary Number of Coupled Nonlinear Schroedinger Equations,” *Phys. Rev. Lett.*, 90, 25, 254102, June 26, 2003 (with M. Soljacic, S. Sears, M. Segev, M. Jakubowski, and R. Squier).
- “Simulating the Madness of Crowds: Price Bubbles in an Auction-mediated Robot Market,” *Computational Economics*, 12, 35-59, 1998 (with D. Shapiro).

Lars E. O. Svensson 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, and a research Fellow of the Centre for Economic Policy Research, London. 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 is active as advisor to Sveriges Riksbank (Bank of Sweden) and regularly consults 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. He is a member of the Academic Advisory Board of the Federal Reserve Bank of New York. He was on leave 2003-2004.

Representative publications:

- “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.
- “The Zero Bound in an Open-economy: A Foolproof Way of Escaping from a Liquidity Trap,” *Monetary and Economic Studies*, 19(S-1), 277-312, February 2001.
- “Transparency and Credibility: Monetary Policy with Unobservable Goals,” *International Economic Review*, 42, 369-397, 2001 (with J. Faust).
- “Inflation Targeting as a Monetary Policy Rule,” *Journal of Monetary Economics*, 43, 607-654, 1999.

Robert Vanderbei is a Professor in Operations Research and Financial Engineering since 1999. Broadly viewed, his research interests are in 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 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 the Massachusetts Institute of Technology, he was the Gilbert W. Winslow Career Development Professor and served as the Director of the Civil Engineering Systems Methodology Group. He held visiting appointments at Harvard University and the University of Louvain (Belgium), his undergraduate alma mater, and was the Shimizu Corporation Visiting Professor at Stanford University. His principal expertise is in engineering risk assessment and applied systems science. He authored *Random Fields: Analysis and Synthesis*, published by the MIT Press, and extended this work to modeling space-time processes and complex systems. He won several research prizes of the American Society of Civil Engineers, 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:

- Matthew Bussmann, “Vulnerability of Tall Buildings to Progressive Collapse: Case of Petronas Towers in Kuala Lumpur, Malaysia”

Representative publications:

- *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, ISBN 0-7844-0623-5, March 2002 (with C. Taylor).
- “Evaluating Models of Risks from Natural Disasters for Insurance and Government,” in *Paying the Price: The Status and Role of Insurance against Natural Hazards in the United States*, Eds. R. Roth & H. Kunreuther, Joseph Henry Press (N.A.S.), 239-249, 1999 (with C. Taylor and J. Davis).
- *Random Fields: Analysis and Synthesis*, The MIT Press, 1983; second (web) edition by Rare Book Services, Princeton NJ, 1998; see www.princeton.edu/evm/.
- *Quantum Origins of Cosmic Structure*, A.A. Balkema Publishers, Rotterdam, The Netherlands & Brookfield, VT, 1997.

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 1982-2005 and has received the Galbraith Award for Graduate Teaching in 1986. 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:

- WWS 507b: Quantitative Analysis
- Economics 513: Advanced Econometrics: Time Series Models
- Economics 518: Econometrics II

Undergraduate students advised:

- Austin Saypol, “Structural Change in Residential Housing Finance and the Dampening of National Output Fluctuations”

Representative publications:

- “Forecasting Using Principal Components from a Large Number of Predictors,” *Journal of the American Statistical Association*, 2003 (with J. Stock).
- “Forecasting Output and Inflation: The Role of Asset Prices,” *Journal of Economic Literature*, 2003 (with J. Stock).
- “Has the Business Cycle Changed and Why?” *NBER Macroeconomics Annual*, 2002, Mark Gertler and Ken Rogoff (eds.) (with J. Stock).

Michael Woodford is the Harold H. Helm '20 Professor of Economics and Banking. He received a J.D. from Yale Law School in 1980 and his Ph.D. in Economics from the Massachusetts Institute of Technology in 1983. He taught at Columbia University and the University of Chicago before joining the Princeton faculty in 1995, and is also a Fellow of the Econometric Society and Research Associate of the National Bureau of Economic Research. He was awarded a John Simon Guggenheim Fellowship in 1998-99. He has written extensively in the areas of intertemporal general equilibrium theory, business cycle theory, and monetary economics. His current

research deals primarily with the theory of monetary policy.

Undergraduate student advised:

- Daniel Ahn, “The Economic Effects of Uncertainty on Long-term Growth”

Graduate students advised:

- Gauti Eggertsson, “Policies to Deal with a Liquidity Trap”
- Andrea Tambalotti, “Optimal Monetary Policy and Technological Progress”
- Zhen Li, “Financial Liberalization and Growth”
- Fabio Milani, “Learning and Inflation Inertia”

Representative publications:

- “Optimal Interest-rate Smoothing,” *Review of Economic Studies*, October 2003.
- “The Zero Interest-rate Bound and Optimal Monetary Policy,” *Brookings Papers on Economic Activity*, 1, 2003 (with G. Eggertsson).
- “Optimal Monetary and Fiscal Policy: A Linear-quadratic Approach,” *NBER Macroeconomic Annual*, 2003 (with P. Benigno).
- *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton: Princeton University Press, 2003.
- *Handbook of Macroeconomics* (Editor), Amsterdam: North-Holland, 3 volumes, 1999 (with J. Taylor).

Wei Xiong is an Assistant Professor in the Economics Department. He received his Ph.D. from the Fuqua School of Business, Duke University, in 2001. 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 the Long-Term Capital Management crisis. He was invited by the *Review of Economic Studies* to present his research on its annual European tour in 2000.

Courses taught:

- ECO 422/FIN 522: Futures, Options and Other Derivatives
- ECO S500: Mathematics for Economists

Undergraduate students advised:

- Brian Cayne, “Tech & The LBO: A Compatibility Test”
- Matthew Chun, “Debt or Equity Markets: Liberatizing the Capital Account in Emerging Markets”
- Peter Coffin, “Informed Trading Around Earnings Announcements: Evidence from the Options Market”
- Ananya Lodaya, “Examining Mezzanine Debt and Junk Bond Debt in Leveraged Buyouts”
- David Sackler, “Analyzing the Efficient Market Hypothesis: Macro to Micro”
- Cyrus Whitney, “All Falls Down: A Look at Currency Crises Past and Future”

Representative publications:

- “Overconfidence and Speculative Bubbles,” *Journal of Political Economy*, 2003 (with J. Scheinkman).
- “Convergence Trading with Wealth Effects,” *Journal of Financial Economics*, 2001.
- “Contagion as a Wealth Effect,” *Journal of Finance*, 2001 (with A. Kyle).

VISITING FACULTY

During the academic year 2003-04, the BCF welcomed the following visiting faculty:

Sugato Bhattacharyya visited us during the 2004 spring term. He is an Associate Professor of Finance at the University of Michigan Business School. He received an MBA from the Indian Institute of Management in 1980 and his Ph.D. from Harvard University in 1990. Dr. Bhattacharyya’s main interests include corporate finance, game theory, and industrial organization.

Course taught:

- ECO 318: Corporate Finance

Louis P. LeGuyader is a Visiting Lecturer in the Department of Economics and has been associated with the Bendheim Center for Finance since 2003. He has been the instructor and preceptor in the University’s accounting course, Economics 333, serving students in a number of concentrations ranging from economics, finance and financial engineering to public policy, history, and the life sciences. He is an adviser to seniors and juniors in their independent research and has given several lectures and seminars on accounting to students ranging from freshmen to degree candidates in the Master in Finance Program. He was previously an adjunct Assistant Professor at Columbia Business School, Columbia University, where he offered courses in introductory accounting and accounting for derivatives. At Columbia he was the Coopers and Lybrand Scholar and a Chazen Institute research award winner; prior to that he was a member of the Price Waterhouse program at Cornell University’s Johnson School. He has pursued his academic and professional interest in the fields of risk management, capital markets and financial instruments for over 27 years. He received his Ph.D. and M.Phil. from Columbia in 1998, his M.B.A. from the University of Virginia in 1981 and his A.B. from Princeton in 1977. He holds a CPA (New York) and is a member of the American Accounting Association and the American Institute of Certified Public Accountants.

Courses taught:

- ECO 333: Financial Accounting
- WWS 582e: The Accounting and Management Process in the Public Sector

Undergraduate students advised:

- Inger Lofgren, “Navigating the Quest for Value. An EVA Analysis of the Global Tanker Industry”
- Joesph Looke, “Entrepreneurism Corrupted: An Analysis of the Fall of Enron”
- Mark Smith, “An Examination of General Electric’s Financial Transparency”
- Spencer Smith, “The Use of Financial Ratios in Predicting Environments of Earnings Manipulation”
- Lauren Washycyn, “Does Expensing Stock Options Cause Share Prices to Decline?”

John Quigley has been teaching his *Venture Capital & Private Equity Investing* (ECO 417/FIN 517) seminar at Princeton for seniors and M.Fin. students each fall since 2001. Mr. Quigley has been part of the Princeton community since 1995, when he helped launch Nassau Capital, the independent firm established to manage the private portion of the University’s endowment. Mr. Quigley has headed Nassau’s direct investment program since the firm’s inception. Mr. Quigley has over twenty years of experience in the private equity investment business. He began his career in 1980 as an attorney with Kirkland & Ellis in Chicago. Thereafter he was a founder of buyout sponsor Adler & Shaykin in New York, where he was a partner throughout the 1980s LBO boom. As the 1990s commenced, Mr. Quigley took an “academic sabbatical” as a Ph.D. candidate in an interdisciplinary economics program at Columbia. He returned to the investment business in 1992 to help establish



Clipper Capital Partners, an independent merchant banking fund sponsored by Crédit Suisse First Boston. Mr. Quigley is a graduate of Georgetown (A.B., *summa cum laude*, 1976), Stanford (J.D., M.B.A., 1980) and Columbia (M.Phil., 1992). He is presently on the boards of KMC Telecommunications, Inc. (Vice Chairman); Comphealth Inc.; Dry Bulk Shipping (BVI) Limited; and The Audax Group. He has previously served as a director of a number of companies, as well as on the advisory boards of several private equity investment firms. Before teaching at Princeton, Mr. Quigley had taught at Columbia Law School and NYU's Stern School of Business throughout the 1990s. He is a member of the Stanford Law School Dean's Strategic Council. Mr. Quigley conducts new investment and philanthropic activities through two entities which he has established, Kewco, L.L.C. and The Civitas Foundation.

Course taught

- ECO 417/FIN 517: Venture Capital & Private Equity Investing

Undergraduate students advised

- Daniel E. Freuman, "The LBO: Unleashing the Forces of Creative Destruction"
- Brian R. Kirschbaum, "The Regulation of Private Equity: Lest We Become Unwitting Victims of the Darkness"
- Jonathan Berger, "Hedge Funds: Risk-return Profiles of Hedge Fund Styles: A Performance Comparison"

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 Director of Investor AB, a publicly traded company based in Stockholm, Sweden, and of two other privately held companies.

Course taught:

- ECO 419/FIN 519: Corporate Restructuring

VISITING FELLOWS

The Center welcomed the following visiting fellows during the academic year 2003-04:

Marco Bonomo is Associate Professor of the Graduate School of Economics of the Getulio Vargas Foundation, Rio de Janeiro, Brazil. He spent the academic year 2003-04 at the Bendheim Center for Finance. His research interests include short-run macroeconomic effects, with emphasis on the role of microeconomic pricing, asset pricing, and political business cycles. He received his Ph.D. from Princeton University in 1992.

Representative publications:

- “Elections and Exchange Rate Policy Cycles,” *Economics and Politics*, forthcoming, 2004 (with C. Terra).
- “Endogenous Time-dependent Rules and Inflation Inertia,” *Journal of Money, Credit and Banking*, forthcoming, 2004 (with C. Carvalho).
- “Optimal State-dependent Rules, Credibility, and Inflation Inertia,” *Journal of Monetary Economics*, 49, 1317-1336, 2002 (with H. Almeida).
- “Consumption and Equilibrium Asset Pricing: An Empirical Assessment,” *Journal of Empirical Finance*, 3, 239-265, 1996 (with R. Garcia).

Andre Monteiro received his Ph.D. from Catholic University of Rio de Janeiro (PUC-Rio) in 2002 and wrote his thesis on term structure of interest rate models. The focus of his research interest is finance and international macroeconomics. He also worked as chief economist and risk manager of Icatu Investment Bank during 1999-2002. He spent the academic year 2003-04 at the Bendheim Center for Finance. During this period, he worked on two issues: The first one is the term structure of country risk premium. He proposes an alternative country-risk-premium term structure based on non-arbitrage assumption behind the currency-risk-adjusted covered interest parity. The alternative curve possesses some financial and statistical advantages compared to the usual sovereign-bond-based curve. The second issue is categorization, a choice strategy well-documented by psychological literature. He proposes a multidimensional standard rational preference structure that incorporates imperceptible difference on a finite set whose elements are described by n attributes. Imperceptible difference is modeled by similarity. The idea of category naturally arises in this formulation. This preference structure is then used to normatively analyze categorization. He has been working on the application of this framework on the problem of portfolio selection. After the end of his visiting period at BCF, he joined Gavea Investments.

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. Eight students graduated in 2003-04.

Dries Darius graduated from the Department of ORFE. His thesis “Optimal Investment under the Constant Elasticity of Variance Model” was written under the direction of Professor Ronnie Sircar. He will continue his career at Citigroup.

Valdo Durrleman graduated from the Department of ORFE. His thesis deals with the relationships between implied and spot volatilities and was written under the supervision of Professor René Carmona. He will be pursuing his career at Stanford University as a Szegő Assistant Professor in the Mathematics Department.

Aytac Ilhan graduated from the Department of ORFE. Her thesis deals with hedging exotic options in incomplete markets and was written under the supervision of Professor Ronnie Sircar. She will be pursuing her academic career as a post-doctorate in Oxford University.

Umit Kaya graduated from the Department of Economics. His thesis deals with corporate governance and was written under the supervision of Professor Patrick Bolton. He will be pursuing his career as a consultant working for Mercer, Oliver, Wyman.

Bruce Preston received his Ph.D. from the Department of Economics. His thesis “Adaptive Learning and the Use of Forecasts in Monetary Policy” was written under the supervision of Professors Jonathan Parker and Michael Woodford. He is now an Assistant Professor at Columbia University in the Economics Department.

Adam Purzitsky graduated from the Department of Economics. His thesis deals with jump-diffusion and random field models of the term structure of interest rates and was written under the supervision of Yacine Aït-Sahalia. He will begin a career in fixed income research at Lehman Brothers.

Koray D. Simsek graduated from the Department of ORFE. His thesis deals with applications of stochastic programming in multi-stage financial planning and was written under the supervision of Professor John Mulvey. He will be pursuing his career as an Associate Professor working for EDHEC Business School in Nice, France.

Jialin Yu graduated from the Department of Economics. His thesis deals with financial econometrics and applications to the exchange rate in China and robust financial decision making. It was written under the supervision of Professor Yacine Aït-Sahalia. He will be pursuing his career as an Assistant Professor working for the finance group at the Columbia University Business School.

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 Ph.D. students of the Center.

Civitas Foundation Finance Seminar Fall 2003

September 17	MARTIN CHERKES Princeton University	<i>"A Positive Theory of Closed-end Funds as an Investment Vehicle"</i>
September 24	DAVID SKEIE Princeton University	<i>"Electronic Money and Banking"</i>
October 1	GURDIP BAKSHI University of Maryland	<i>"Book Values, Earnings, and Market Valuations"</i>
OCTOBER 8	WAYNE FERSON Boston College	<i>"Evaluating Bond Government Fund Performance with Stochastic Discount Factors"</i>
October 22	THALEIA ZARIPHOPOULOU University of Texas at Austin	<i>"Pricing Algorithms and Portfolio Choice in Incomplete Markets"</i>
November 5	JENNIFER CARPENTER New York University	<i>"Portfolio Performance and Agency"</i>
November 12	ROMAN INDERST London School of Economics	<i>"Credit Risk Analysis and Security Design"</i>
November 19	MARK DAVIS Imperial College	<i>"Optimal Investment with Randomly Terminating Income"</i>
December 3	DIMITRI VAYANOS Massachusetts Institute of Technology	<i>"Flight to Quality, Flight to Liquidity, and the Pricing of Risk"</i>
December 10	NICOLE EL KAROUI École Polytechnique	<i>"Optimal Derivatives Design under Dynamic Risk Measures"</i>

Civitas Foundation Finance Seminar Spring 2004

March 3	PETE KYLE Duke University	<i>"Strategic Acquisitions and Investments in a Duopoly Patent Race under Uncertainty"</i>
March 10	TORBEN ANDERSEN Northwestern University	<i>"Some Like it Smooth, and Some Like it Rough: Untangling Continuous and Jump Components in Measuring, Modeling, and Forecasting Asset Return Volatility"</i>
March 31	STEVE HESTON University of Maryland	<i>"Options and Bubbles"</i>
April 7	SUGATO BHATTACHARYYA University of Michigan	<i>"Marketing to Market Trading Activity, and Mutual Performance"</i>
April 14	STEVE KAPLAN University of Chicago	<i>"Private Equity Performance Returns, Persistence and Capital Flows"</i>
April 21	DAVID SCHARFSTEIN Harvard Business School	<i>"Organizational Scope and Investment: Evidence from the Drug Development Strategies of Biopharmaceutical Firms"</i>
April 28	JESSICA WACHTER New York University	<i>"The Declining Equity Premium: What Role Does Macroeconomic Risk Play?"</i>
May 5	DEAN KARLAN Princeton University	<i>"Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines" (joint with the Behavioral Economics Seminar)</i>
May 10-11-12	BILL SHARPE Stanford University	<i>"2004 Princeton Lectures in Finance, Asset Prices and Portfolio Choice: Lecture 1, Equilibrium; Lecture 2, Diversity; Lecture 3, Protection"</i>

CONFERENCES

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

The Princeton Lectures in Finance

The BCF organizes each year a series of public lectures, The Princeton Lectures in Finance, 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 2004 *Princeton Lectures in Finance* were given by William Sharpe, Professor Emeritus at Stanford University, the 1990 Nobel Laureate in Economics, on the topic of "Asset Prices and Portfolio Choice":

- Lecture 1: Equilibrium, Monday May 10
- Lecture 2: Diversity, Tuesday May 11
- Lecture 3: Protection, Wednesday May 12

The 2005 *Princeton Lectures in Finance* will be given by Douglas Diamond of the University of Chicago.

In previous years, Professor Stephen A. Ross, the Franco Modigliani Professor of Financial Economics at the Massachusetts Institute of Technology, delivered the May 2001 lectures at the BCF on the theme of Arbitrage and Finance. The second lecturer and author was Professor Myron Scholes, Emeritus Professor at Stanford University and 1997 Nobel Laureate. He delivered his lectures at the BCF on the theme of Liquidity and Finance in May 2002. There were no lectures in 2003.

Oxford-Princeton Workshops on Financial Mathematics & Stochastic Analysis

The first workshop took place on October 17-18, 2002 (at Princeton) and the second on March 19-21, 2004 (at Oxford). They are part of the Oxford-Princeton collaboration and are designed for an informal exchange of ideas between the Mathematical Finance group at Oxford and the Financial Engineering group at Princeton. The next workshop will take place at Princeton in 2006.

Speakers and Participants

- Raymond Brummelhuis, Birkbeck College, University of London
- René Carmona, Princeton University
- Álvaro Cartea, Birkbeck College, University of London
- Damien Challet, University of Oxford
- Miriam Cisneros, University of Oxford
- Michael Dempster, University of Cambridge
- Andrew Dickinson, University of Oxford
- Valdo Durrleman, Princeton University
- Marcelo Figueroa, Birkbeck College, University of London
- Neil Firth, University of Oxford
- Adrian Gfeller, London School of Economics
- Ben Hambly, University of Oxford
- Vicky Henderson, Princeton University
- David Hobson, Princeton University and University of Bath
- Sam Howison, University of Oxford
- Aytac Ilhan, Princeton University

- Diego Jiménez-Huerta, London School of Economics
- Tino Kluge, University of Oxford
- Mike Ludkovski, Princeton University
- Terry Lyons, University of Oxford
- Andrea Macrina, Kings College London
- S. Malik, Ukraine
- Elena Medova, University of Cambridge
- Michael Monoyios, Brunel University
- John Mulvey, Princeton University
- Chris Potter, University of Oxford
- Alet Roux, University of Hull
- William Shaw, University of Oxford
- Koray Simsek, Princeton University
- Ronnie Sircar, Princeton University
- H. Mete Soner, Koc University
- Krzysztof Tokarz, University of Hull
- Jeannette Woerner, University of Goettingen
- Tomasz Zastawniak, University of Hull

PROGRAM

Friday March 19, 2004

- 16.00-16.10 Opening
- 16.10-16.50 Ronnie Sircar, *Games with Exhaustible Resources*
- 16.50-17.30 Damien Challet, *Information Efficiency and Stylized Facts in Minority Models of Financial Markets*
- 17.30-18.10 Vicky Henderson, *Valuing Real Options Without a Perfect Spanning Asset*
- 18.10-18.40 (Break)
- 20.00- Workshop dinner at Christ Church, McKenna room

Saturday March 20, 2004

- 9.30-10.00 Chris Potter, *Stochastic Volatility and Variance Swaps*
- 10.00-10.30 Valdo Durrleman, *From Implied to Spot Volatilities*
- 10.30-11.00 (Break)
- 11.00-12.00 René Carmona, *Mathematical Challenges of the Energy Industry: A Sample from my Own Experience*
- 12.00-12.30 Mike Ludkovski, *Stochastic Control for Energy Assets*
- 12.30-13.30 Lunch
- 13.30-14.00 Tino Kluge, *A Stochastic Model for Electricity Prices*
- 14.00-14.40 Álvaro Cartea, *Generalised Fractional Black-Scholes: Pricing and Hedging*
- 14.40-15.20 Ben Hambly, *Monte Carlo Methods for Multiple Exercise Options*
- 15.20-16.00 (Break)
- 16.00-16.40 Sam Howison, *Continuous and Discrete Sampling for Swing and Barrier Options*
- 16.40-17.20 John Mulvey, *A Long-short Equity Strategy Based on Separating Hyperplanes*
- 17.20-18.00 Jeannette Woerner, *Inference for Stochastic Volatility Models of Various Types*

Sunday March 21, 2004

- 10.00-10.30 Koray Simsek, *Valuation of DB & DC Pension Plans in the U.S.*
- 10.30-11.00 Aytac Ilhan, *Optimal Static-dynamic Hedges for Barrier Options*
- 11.00-11.30 Andrew Dickinson, *On the Efficacy and Potential Limitations of Quasi-Monte Carlo Methods Applied to Finance*

Energy Risk Conference

The second workshop in the energy risk series, organized by René Carmona and co-sponsored by the Bendheim Center for Finance, took place on Friday, October 10, 2003, in the Friend Center, rooms 103 and 104.

In the last two years, the U.S. electric and natural gas markets have dramatically deteriorated. A booming business at the cutting edge of innovation and financial research has disappeared, leaving an industrial sector struggling for survival and deserted by disgruntled investors.

The initial efforts at electric deregulation in the United States have generally been viewed as a failure or, at best, inconclusive. Deregulation was promoted as a direct route to lower, fairer and more understandable prices. Instead, it is generally acknowledged that after deregulation, retail prices often went up, small consumers had less pricing leverage than larger consumers, and pricing structures and industry rules were incomprehensible other than to a small minority of market participants. Finally, corruption, unprecedented price volatility, and service disruptions ensued after deregulation. The state of California was the first state in the nation to enact electric power restructuring. We know now that its original competitive market design did not work, and this failure continues to cast doubt over the status of electric power deregulation across the United States. The initial drive towards deregulation has been reversed in many states which have cited the California debacle as the main reason for their decision to rethink their plans to open the electric power markets to competition. The blackout of 2003 has created another dramatic reason for rethinking the theory and rationale for deregulation. Despite the failure of the California experiment, the Federal Energy Regulatory Commission (FERC) is still committed to opening electricity markets. Indeed, the FERC continues to push for new policies and new market designs.

The purpose of this workshop is to bring together policy makers, regulators, business representatives, consumer advocates and academicians to address these issues in an independent setting.

PROGRAM

- 8:30-8:50 a.m. Breakfast
- 8:50-9:00 a.m. Welcome, Opening Remarks
- 9:00-10:00 a.m. Keynote Speaker: Vernon L. Smith, George Mason University, 2002 Nobel Laureate in Economics: “Electricity Market Success Requires Deregulation Down to the End-User Outlet Plug”
- 10:15 a.m.-12:15 p.m. — *Panel #1: The Structure of the Electricity Markets — Past, Present and Future — and the Resulting Implications for Market Participants*
- Chair: Pete Cartwright, Founder and CEO of Calpine Co.
 - What are the implications of the California experience and the blackout of 2003 for the future of electric deregulation?
 - Is timely national retail electric deregulation feasible or must we wait for state by state action?
 - Can resident and small commercial consumers benefit from retail deregulation?
 - Can retail electricity deregulation lead to non-discriminatory electric consumption reductions?

Panelists

- David Freeman, Chairman of the California Power Utility (CPU)
 - Jimmy Glotfelty, Senior Policy Advisor of the DoE Secretary
 - Nettie Hoge, Executive Director, TURN
 - James Sweeney, Professor, Stanford University
 - Robert Willig, Professor, Woodrow Wilson School, Princeton University
- 12:30-1:50 p.m. Lunch
- 2:00- 3:20 p.m. *Panel #2: Energy Trading & Risk Management*
- Chair: Richard Peters: Boston Consulting Group
 - In retrospect, did trading have a positive impact on the electric markets?
 - Why have so many merchant generators failed financially?

— How should energy trading companies be organized and capitalized in the future?

Panelists

- Paul Addis, CEO, Louis Dreyfus Energy
- Dan Gates, Managing Director, Moody's
- Vince Kaminski, Senior Vice-President, Reliant

3:40- 5:00 p.m. *Panel #3: Capital Intensive Investments in the Electric Market*

- Chair: Joseph S. Fichera, CEO, Saber Partners LLC
 - Can portfolio risk in the electric markets be adequately quantified?
 - Can long dated merchant portfolio financial risk be adequately controlled?
 - How should merchant generation be financed in the future?
 - Do adequate incentives and regulations exist to assure transmission and distribution investments in the future?

Panelists

- René Carmona, Professor, Princeton University
- Robert Hoglund, Managing Director, Citigroup
- Rodney Miller, Managing Director, Crédit Suisse First Boston (CSFB)
- Richard P. O'Neill, Chief Economic Advisor, FERC

Political Economy of Financial Markets Conference

This conference, sponsored by the Bendheim Center for Finance, the Research Program in Political Economy, and the Mamdouha S. Bobst Center for Peace and Justice, with support from the National Science Foundation was held at Princeton University on September 26-27, 2003.

Organizing Committee: Erik Berglöf, Stockholm; Patrick Bolton, Princeton; Randall Kroszner, Council of Economic Advisors (on leave from Graduate School of Business, Chicago); Marco Pagano, Salerno; Roberta Romano, Yale; Howard Rosenthal, Princeton.

The Princeton conference was the fifth in a series beginning with the conference on "The Political Economy of Contractual Obligations" at Lake Arrowhead in 1999 sponsored by UCLA, and the three conferences of the European Union CEPR network on Understanding Financial Architecture at Frankfurt, 2000, Madrid, 2001, and Oxford, 2002.

PROGRAM

Friday 9:30-12:30 p.m. Session 1

- Lucian Arye Bebchuk, Harvard Law School, "Asymmetric Information and the Choice of Corporate Governance Arrangements," Discussant, Randall Kroszner, American Enterprise Institute and University of Chicago.
- Julian Franks, London Business School, Colin Mayer, Saïd Business School, University of Oxford, Stefano Rossi, London Business School, "Ownership: Evolution and Regulation," Discussant, Ernst-Ludwig von Thadden, University of Lausanne.

Friday 12:30-2:00 p.m. Lunch

Friday, 2:00-5:00 p.m. Session 2

- Roberto Chang, Rutgers University, "Electoral Uncertainty and the Volatility of International Capital Flows," Discussants, William Clark, NYU and Sudipto Bhattacharya, LSE.
- Mihir A. Desai, Harvard Business School, Alexander Dyck, Harvard Business School, and Luigi Zingales, University of Chicago, "Corporate Governance and Taxation," Discussant, Henry Hansmann, NYU Law School.

Friday, 7:00 p.m. Dinner

Saturday, 9:00-12:00 Session 3

- Bradley A. Hansen, Mary Washington College and Mary Eschelbach Hansen, American University, "The Transformation of Bankruptcy in the United States," Discussant, David Skeel, University of Pennsylvania Law School.

- Naomi Lamoreaux, UCLA, and Jean-Laurent Rosenthal, UCLA, "Organizing Middle-sized Firms in the United States and France; 1830-2000," Discussant, Peter Gourevitch, UCSD.

Saturday, 12:00-1:00 p.m. Lunch

Saturday, 1:00-4:00 p.m. Session 4

- Bruno Biais, Université de Toulouse, and Thomas Mariotti, LSE and Université de Toulouse, "Credit, Wages, and Bankruptcy," Discussant: Alberto Bennardo, UCLA and Salerno.
- Philip Bond, Wharton School, University of Pennsylvania, "Laws and Contracts," Discussant: Mitchell Berlin, Federal Reserve of Philadelphia

Saturday, 7:00 p.m. Dinner

BCF Finance Industry Seminar Series

The Princeton Entrepreneurship Club and the Princeton Pre-Business Society assisted Swati Bhatt in organizing the following seminar series. Speakers for this seminar series were invited from the corporate world.

- **September 29, 2003:** "Hedge Funds 101." Andrew Greenberg of Citadel Investments, Managing Director of Global Event Driven Investing, is responsible for the oversight of the North American Risk Arbitrage and Equity Restructuring Portfolios, which includes portfolio selection, research and trading.
- **October 20, 2003:** "Does ECO317 Translate into the Real World?" Alan Brown, Group Chief Investment Officer at State Street Global Advisors, looked at the future of fund management, briefly discussed the question of active vs. passive management, and encouraged students to think about the equity risk premium.
- **November 10, 2003:** "How to Find a Senior Thesis Topic in Finance or 'Quantitative Equity Research: How Wall Street Applies Academic Research to Make Money in Stocks'." Dr. Matthew Rothman, senior analyst at Sanford Bernstein, covered why investors' greed, fear, stubbornness, inability to understand the length and trajectory of a trend or the most basic rules of probability theory is a good thing for those who are quantitatively inclined. He focused exclusively on the equity markets, discussing how good ideas are put into practice, what distinguishes a good idea from a bad idea, and how academic research has found its way to Wall Street.
- **December 8, 2003:** "Early Stage Venture Capital." Kef Kasdin '83, General Partner, Battelle Ventures spoke on what to look for in a Business Plan, who's the customer, what's their problem/pain, how is it being solved today, how can NewCo solve their problem significantly better, what's the value proposition to the customer, how big is the market, is there competition, is the management experienced in the market, and is there a valid business model? This talk was particularly useful for participants in the Business Plan Contest.
- **November 24, 2003:** "How to Write a Business Plan." Kent Hawryluk, General Partner with Twilight Venture Partners, LLC, a venture capital firm focused on early-stage life science investments.
- **March 1, 2004:** "A Different Kind of Investment Banking: Muni Bonds at a Regional Firm." John Rose '72, President and CEO of Seattle-Northwest Securities Corporation, discussed his experience in investment banking as an underwriter of municipal bonds at a regional firm. He described the work life of an investment banker working with governmental agencies in the sale of municipal bonds to finance a variety of public projects. He stressed that the rewards and lifestyles are very different from Wall Street corporate finance, but the intellectual challenge is still strong.
- **April 19, 2004:** Rachel Waxberg, Goldman Sachs, hosted a workshop at the Nassau Inn to discuss career issues in finance. This workshop was helpful to students working in financial services, consulting and all industries in between.



UNDERGRADUATE CERTIFICATE IN FINANCE

The BCF started offering in 1999 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. For non-Economics or ORFE majors only, if there is no possibility of finance content in their senior thesis, a separate, shorter piece of independent work is required instead.

Now in its sixth year, the Undergraduate Certificate in Finance continues to do extremely well. We enrolled 155 juniors from the Class of 2006, an increase from the numbers of the previous years (Class of '00: 61, '01: 82, '02: 85, '03: 122, '04: 135, '05: 141), bringing our total number of undergraduate students in the program (juniors and seniors) to 296 this year.

Also encouraging is the fact that the 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 '04

Total number of certificates awarded: 113 (35 to women or 31%)

MAJOR	NUMBER OF STUDENTS
Art and Archeology	1
Computer science (COS)	4
Economics	48
Engineering (other than ORFE and COS)	9
English	1
History	3
Mathematics	2
Operations Research and Financial Engineering (ORFE)	30
Philosophy	2
Physics	1
Politics	5
Sociology	1
Woodrow Wilson School	6

Class of '05

Total expected number of certificates to be awarded: 141

MAJOR	NUMBER OF STUDENTS
Chemistry	1
Computer Science (COS)	6
Economics	61
East Asian Studies	1
Engineering (other than ORFE and COS)	7
French and Italian	1
German	1
History	1
Mathematics	1
Molecular Biology	1
Operations Research & Financial Engineering (ORFE)	45
Physics	1
Politics	8
Woodrow Wilson School	6

Departmental Prizes, Honors and Athletic Awards to UCF '04 Students

In addition, UCF students are an extremely talented subgroup of the already high-achieving Princeton classes. They continue to receive an extraordinary proportion of the prizes awarded by their respective departments. All together, in 2004, 71 UCF students or 63% of the 113 graduating certificate recipients received departmental prizes, honors, athletic awards or some combination of all three.

- Four UCF students received a combination of departmental prizes and honors and athletic awards:
- John Paul Ference (Operations Research and Financial Engineering or ORFE): cum laude in ORFE, and Gordon Sykes Medal for light weight crew
 - Elliot Holland (Civil and Environmental Engineering): Mack Angus Prize for best student in CEE, summa cum laude, and George J. Mueller Award for Athletics
 - Brian Kirshbaum (Politics): cum laude in Politics, Gifford Trophy for Wrestling and Treide Trophy for Wrestling
 - John Nuger (History): Joline Prize in American History and summa cum laude in History and Class of 1916 Athletic Award

Seventeen UCF students received departmental prizes and honors:

- Daniel Brand (Economics): Senior thesis prize in finance and magna cum laude in Economics
- Joanna Deitch (Economics): Senior thesis prize in finance and magna cum laude in Economics
- Jing Ge (Computer Science): Phillip Goldman '86 Prize in Computer Science and summa cum laude
- Benjamin Handel (Computer Science): Applied and Computational Mathematics Independent Project Prize, magna cum laude in Economics
- Philippe Inagaki (Physics): Allen Shenstone Prize in Physics and magna cum laude
- Robert Mulcare (Woodrow Wilson School): George Mitchell Scholarship and Lieutenant John Larkin Memorial Prize and summa cum laude in WWS
- Avinash Rao (ORFE): Kenneth Condit Prize and summa cum laude in ORFE
- Jonathan Sagal (Philosophy): Class of 1869 Prize in Ethics and summa cum laude
- Joshua Saltman (ORFE): Kenneth Condit Prize and summa cum laude in ORFE
- Austin Saypol (Economics): Wolf Balleisen Memorial Prize for best thesis, Halbert White '72 Prize for best

economics student and summa cum laude in Economics

- Parag Shah (Electrical Engineering): John Ogden Bigelow Prize in Electrical Engineering and cum laude in Electrical Engineering
- Adam Shukovsky (ORFE): Frank Castellana Prize in ORFE and summa cum laude in ORFE
- Anthony Sun (Electrical Engineering): David Forney Prize and summa cum laude in Electrical Engineering
- Brian Tsang (Computer Science): Accenture Prize, Phillip Goldman '86 Prize in Computer Science and James Hayes-Edgar Palmer Prize in Engineering (across entire Engineering) and summa cum laude
- Lauren Washychyn (Economics): Halbert White '72 Prize for best Economics student and summa cum laude in Economics
- Amy Wu (Economics): Daniel Rubinfeld '67 Prize for best empirical thesis, cum laude in Economics
- Ashley Zohn (Sociology): Isidore Brown Academic Achievement Award and Isidore Brown Thesis Award and summa cum laude in Sociology

Five UCF students received athletic awards:

- Jonathan Kielizak (Electrical Engineering): Bonthron Trophy for Wrestling
- William Osnato (ORFE): George McFarland Squash Award
- George Pilcher (ORFE): Richard Colman-Scholar-Athlete Award
- Tim Releford (ORFE): Class of '52 Football Award
- Juan Valdivieso (Woodrow Wilson School): Dermot Quinn Memorial Swimming Award, War Memorial Trophy (Swimming) and member of 2004 Olympic Peruvian National Swim Team

Finally, 45 UCF students received some form of honors (23 cum laude, 14 magna cum laude and 8 summa cum laude).

Senior Theses of the Class of '04

This table shows the titles of a selection of senior thesis titles from the Undergraduate Certificate in Finance class of 2004:

Naim Abdullah	<i>Failure of Governance: A Case Study on Worldcom, Inc.</i>
Pyoung Hyun Ahn	<i>The Economic Effects of Uncertainty on Long-term Growth</i>
Brandon Ashe	<i>Using Monte Carlo Simulation to Determine the Exercise and Price of Bermuda Options</i>
Christian Asmar	<i>Time as Money: Applying Financial Risk Metrics to Shortest Path Problems</i>
Christopher Baker	<i>Capacity Constraints in Repeated Competition: An Extended Game Theory Approach to Duopoly</i>
Kate Barber	<i>A Rounding Model for Option Pricing</i>
Elizabeth Bell	<i>The Effects of Revenue Sharing and Salary Caps on Competitive Balance and Financial Profitability within Professional Sports Leagues</i>
Sandhya Bondada	<i>Modeling the Impact of Funding on Tuberculosis Control in India</i>
Eric Boorstin	<i>Music Sales in the Age of File Sharing</i>
Daniel Brand	<i>The Method of Payment in Mergers & Acquisitions: Determinants and Stock Price Impact</i>
Michelle Jennifer Breyer	<i>Extendible Options: Pricing and Analysis</i>
Brian Cayne	<i>The 'Other' Workforce: A Study of the Illegal Immigrant Day Labor Market</i>
Warren Cheng	<i>Identifying Inefficiencies in Current Methods of Determining Baseball Contracts</i>
Elliot Choi	<i>The Effects of Unofficial Dollarization and United States Monetary Policy on Latin American Stock Market Returns</i>
Jason Chu	<i>The Airline Deregulation Act Revisited: Effects on Returns and Risk in the United States Airline Industry</i>

Matthew Chun	<i>Debt or Equity Markets: Liberalizing the Capital Account in Emerging Markets</i>
Peter Coffin	<i>Informed Trading Around Earnings Announcements: Evidence from the Options Market</i>
Daniel Cohen	<i>Stocks and 'Barry Bonds': Evaluating Players and Optimal Team Strategy in Baseball Free Agent Markets</i>
Christopher Connolly	<i>The Impact of Small-cap Mutual Fund Flows on the Short-term Prices of Equity Holdings</i>
Kevin Crowe, Jr.	<i>The Emergence of an Asset Class: An Empirical Analysis of Private Equity Performance</i>
William Scott Danford	<i>The Term Structure of Credit Default Swaps in a Structural Yield Model</i>
Joanna Deitch	<i>Defining the Concept of the Value Stock: Book-to-market versus Price-to-earning, Dividend Yield, and Earnings Growth</i>
John Paul Ference	<i>Stochastic Efficiency in Portfolio Optimization: Properties and Computation</i>
Daniel Freuman	<i>The LBO: Unleashing the Forces of Creative Destruction?</i>
Kelly Ann Gaydos	<i>Negative Prices in Competitive Electricity Markets</i>
Jarrold Grover	<i>Reform of Securities Regulation in Canada</i>
Nimish Jain	<i>Real Options: A Comparative Evaluation of Existing Models</i>
Crystal Jiang	<i>The Problem of Debt: An Empirical Analysis of the Effect of Collective Action Clauses on Emerging Market Bond Yield Spreads</i>
Nicholas Kalmbach	<i>Competition in the Airline Industry: The Battle Between Legacy and Low Cost Carriers</i>
Cameron Koczon	<i>VCARD: Venture Capital and Racial Discrimination</i>
Donald Komorous	<i>The Stock Split Anomaly: An Analysis of Underreaction to Stock Splits</i>
Kendra Kramlich	<i>Accounting for Intangible Assets: A Theoretical and Empirical Analysis</i>
Katherine Kuga	<i>The Effects of Various Macroeconomic Variables on the Stock Market</i>
Katherine Ledbetter	<i>Student Loans: Financing the Future or Destroying it with Debt? A Look at Student Borrowing and Repayment Characteristics</i>
Ananya Lodaya	<i>Examining Mezzanine Debt and Junk Bond Debt in Leveraged Buyouts</i>
Inger Lofgren	<i>Navigating the Quest for Value. An EVA Analysis of the Global Tanker Industry</i>
Corey Magyar	<i>The Role of Hedge Funds in the Underpricing of Convertible Debt Offerings</i>
Melissa Maquilan	<i>An Analysis of Expected Shortfall as a Method of Measuring Risk in Credit Portfolios</i>
Wei Hung Vincent Ng	<i>Learning to Buy Futures: An Approximate Dynamic Programming Approach</i>
Joy Nims	<i>Executive Compensation & Earnings Restatements: An Unintended Consequence of Equity-Based Pay</i>
John Park	<i>The Revival of the Asian Tiger: Corporate Governance Reform In South Korea</i>
Claire Pearson	<i>The Stock Market Response to Pharmaceutical Patent Legislation</i>
Avinash Rao	<i>Credit Risk Extensions to the Markovian Model</i>
Ryan Reich	<i>Behavioral Biases and Market Anomalies: An Analysis of Closed-end Mutual Funds as a Proxy for Investor Sentiment</i>
Timothy Releford	<i>Corporate Accounting Fraud: Are There Statistical Indications?</i>
Ryan Rich	<i>Relating Budget Deficits to Interest Rates: A New Procedure</i>
Joshua Saltman	<i>A Comparison of the Auction and Bookbuilding Methods for Initial Public Offerings</i>
Austin Saypol	<i>Structural Change in Residential Housing Finance and the Dampening of National Output Fluctuations</i>
Adam Shukovsky	<i>Hedging European Options in the Presence of Transaction Costs</i>
Nada Siddiqui	<i>Re-engineering Portfolio Theory: Optimizing the Diversification of LVMH</i>
Jordan Sinclair	<i>Deriving Order from Chaos: A Study in Technical Trading</i>
Devaushi Singham	<i>The Option to Abandon as Applied to the Sequential Investment Problem</i>
Joseph Stabler	<i>Shareholder Democracy: Plurality Voting, Board of Representation, and Access to the Corporate Ballot</i>

Paul Stamas	<i>The Case for Executive Stock Options: Tailoring Option Plans to Maximize Shareholder Value</i>
Eric Stodola	<i>Inflation Targeting and Asset Prices: An Expose</i>
James Tieng	<i>Reforming the Boardroom: Sarbanes-Oxley, Board Independence, and Firm Performance</i>
Gianfranco Tripicchio	<i>The Effects of Mortgage Convexity Hedging on Long-term Interest Rates</i>
Edward Tsui	<i>Evaluation and Improvement of Technical Trading Rules on the Foreign Exchange Market</i>
Lauren Washychyn	<i>Does Expensing Stock Options Cause Share Prices to Decline?</i>
Joseph Weiss	<i>An Examination of Market Efficiency in the National Football League Betting Market</i>
Kevin Whitton	<i>Arbitrage Opportunities in Undeveloped California Real Estate</i>
Scott Willig	<i>Dividend Taxation and Market Valuation</i>
Vippy Sze Yan Wong	<i>Severe Acute Respiratory Syndrome: Financial Analysis and Methods for Impact Reduction</i>
Amy Wu	<i>The Profitability of the Periodic Term Structure of Momentum in an Enhanced Index Fund: Implications for Market Efficiency</i>
Brian Zakutansky	<i>Improving the Fare Structure of the New York City Subway System: An Economic Perspective</i>
Aaron Zimmerman	<i>Pricing to a Different Tune: A Mathematical Model for the Sale of Music in the Digital Marketplace</i>

Mini-Course on Financial Modeling, Valuation and Analysis Using Excel

This four-session, not-for-credit, mini-course, taught students the fundamentals of constructing financial models in Microsoft Excel. It was 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.

Students gained a proficiency in Microsoft Excel and its use as a tool for rigorous financial analysis. They were also 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.

All Undergraduate Certificate in Finance and Master in Finance students were strongly encouraged to attend. The four lectures took place from 7:00pm until 8:30pm, in the Friend Center Room 101, on the following dates:

- Thursday September 18, 2003
- Thursday September 25, 2003
- Thursday October 2, 2003
- Thursday October 9, 2003

On-line tutorials in Microsoft Excel were provided to all students. The course was taught by Thayer Patterson with guest lecturers from investment banking, asset management, and private equity.

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 will 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 and portfolios. 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 career assistance to students, including help with internships and job placement, through its own staff. The program does have 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 semesters. However, students with a high degree of preparation can complete the curriculum in two semesters. This flexible format allows exceptionally well-prepared students to complete the program in as little as one academic year. The program will additionally accept very qualified and motivated part-time students, who will be allowed up to eight semesters to complete the program requirements, subject to annual review of the student's 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, along a number of coherent "tracks."

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 covering probability and topics in mathematics, as required for the core courses, will be offered to students prior to the beginning of classes in the fall.

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 a school where English is the language of instruction must take the TOEFL.

STATISTICS ON THE ADMISSION PROCESS

	APPLICATIONS	OFFERS	ACCEPTANCES
January 01	126	29	15
May 01	91	13	10
January 02	194	14	8
May 02	105	4	2
January 03	202	13	8
May 03	41	0	0
January 04	200	19	9

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

	BACHELOR	MASTER	PH.D.
January 01	76%	24%	1%
May 01	60%	36%	3%
January 02	89%	11%	1%
May 02	83%	15%	2%
January 03	78%	20%	1%
May 03	80%	17%	2%
January 04	85%	15%	1%

APPLICANT PROFILE: GENDER & AGE

	FEMALE	MALE	MEDIAN AGE
January 01	30%	70%	25
May 01	20%	80%	27
January 02	29%	71%	25
May 02	27%	73%	25.5
January 03	32%	68%	25
May 03	32%	68%	27
January 04	29%	71%	24

APPLICANT PROFILE: GRE SCORES MEAN (MEDIAN)

	ANALYTICAL	QUANTITATIVE	VERBAL
January 02 Applicants	721 (730)	783 (790)	775 (605)
May 02 Applicants	667 (700)	754 (770)	494 (460)
September 02 Entering Class	703 (710)	773 (780)	578 (595)
January 03 Applicants	721 (750)	774 (800)	569 (580)
May 03 Applicants	748 (760)	764 (775)	589 (580)
September 03 Entering Class	777 (780)	794 (820)	605 (615)
January 04 Applicants	714 (810)	776 (790)	554 (560)
September 04 Entering Class	768 (780)	786 (800)	609 (620)

Program Requirements

The program requirements consist of 6 core courses and 10 elective courses (see list below), with the following provisions:

- At least 5 of the elective courses must be at the level 500 or higher.
- At least 5 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. Admission letters will specify the expected length of study. 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).
- 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 and personal computers, 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 C++.

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:

Fall Semester

- ECO 317: Financial Investments
- FIN 501/ORF 514: Asset Pricing I: Pricing Models and Derivatives
- ORF 505/FIN 505: Regression and Applied Time Series

Spring Semester

- FIN 502: Corporate Finance and Financial Accounting
- ORF 515/FIN 503: Asset Pricing II: Stochastic Calculus and Advanced Derivatives
- ORF 504/FIN 504: Financial Econometrics

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
- ECO 420: 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 335/ECO 335: Introduction to Financial Engineering
- 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 574: Special Topics in Investment Science

List 2: General Methodology for Finance

- APC 350: Methods in Partial Differential Equations
- APC 503: Analytical Techniques in Differential Equations
- APC 518/ORF 518: Applied Stochastic Analysis and Methods
- CEE 548: Risk Assessment and Management
- 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: Distributed Computing
- ECO 411: 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: Topics in Econometrics
- 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 491: High-tech Entrepreneurship
- MAE 507: Basic Numerical Methods for Ordinary and Partial Differential Equations
- MAT 304: Introduction to Partial Differential Equations
- MAT 305: Mathematical Programming
- MAT 584/APC 584: Wavelets: An Introduction
- MAT 591/MAT 592: Applied Partial Differential Equations
- 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 macro-economic 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 macro models.

FINANCIAL TECHNOLOGIES

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.

Some Course Descriptions

FIN 501: ASSET PRICING I: PRICING MODELS AND DERIVATIVES

Provides an introduction to the modern theory of asset pricing. Topics include: (i) no arbitrage, Arrow-Debreu prices and equivalent martingale measures, (ii) security structure and market completeness, (iii) mean-variance analysis, Beta-pricing, CAPM, and (iv) introduction to derivative pricing.

FIN 502: CORPORATE FINANCE AND FINANCIAL ACCOUNTING

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 the skills necessary to become informed users of financial statements.

FIN 512: TRADING AND SECURITIES MARKETS

The organization and regulation of stock markets; price formation, volatility, and liquidity in the secondary market (market microstructure). The course will also focus on stock market crashes, Keynes beauty contest comparison, and herding behavior. 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. Topics include 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 517: VENTURE CAPITAL & PRIVATE EQUITY INVESTING

This course will concern itself with the central issues related to venture capital and private equity investing. Topics to be covered include the following: The contractual arrangements between entrepreneurs and venture capital providers; the structure and governance of investment funds; valuation, pricing and structuring of investment transactions; and the current state of the private equity/venture capital industry (including analysis of the trends behind the explosive growth of the pool of capital available for so-called “alternative” investments).

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 1997 Nobel prize in economics), binomial tree method and risk-neutral valuation method. We will also discuss extensively 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.

ORF 504/FIN 504: FINANCIAL ECONOMETRICS

This course covers the econometric methods as applied to finance. Topics include: (i) measurement issues in finance; (ii) the predictability of asset returns; (iii) estimation of multifactor asset pricing models and portfolio problems; (iv) econometric methods for option pricing and models for implied volatilities and risk-neutral

densities; (v) estimation methods for continuous-time models; (vi) maximum-likelihood methods in finance; (vii): nonlinearities in financial data and nonparametric methods.

FIN 560/561: MASTER'S PROJECT I & II

Under the direction of a Bendheim affiliated faculty member, students carry out a Master's project, write a report, and present the results in the form of a poster or an oral presentation in front of an examining committee.

FIN 562: EXTRAMURAL SUMMER PROJECT

A summer research project designed in conjunction with the student's advisor and an industrial, or government sponsor that will provide practical experience relevant to the student's course of study.

ECO 525/FIN 595: FINANCIAL ECONOMICS I

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

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 are studied.

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 335: INTRODUCTION TO FINANCIAL ENGINEERING

Financial engineers design and analyze financial products. These products improve the efficiency of markets and create novel mechanisms for reducing risks. This course is an introduction to financial engineering.

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: MODERN REGRESSION AND TIME SERIES

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, hidden Markov models and filtering.

ORF 515/FIN 503: ASSET PRICING II: STOCHASTIC CALCULUS AND ADVANCED DERIVATIVES

The uses of stochastic calculus in modeling and analysis of diverse phenomena in engineering and finance. It reviews Markov processes and Brownian motion, introduces martingales and stochastic differential equations, and concludes with applications to diffusions and financial engineering.

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

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, risk of default.

Master in Finance Placement Record

Our program has continued to enjoy excellent success with 100% of our graduates being placed in finance industry jobs or going on to Ph.D. programs. 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 dedicated placement advisors, David H. Blair (Director of Corporate Relations) and Swati Bhatt (Director of Student Programs).

This year a three-day "boot camp" introductory program was developed for the incoming students prior to the beginning of classes in September. The camp focused 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 both the BCF faculty 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. As a result, we will be repeating the experiment in September 2004, with the "boot camp" likely to become a permanent fixture of the MFin program.

The networking efforts of our two dedicated placement advisors, the strong support from our Corporate Affiliates and Advisory Council, and the success enjoyed by our first two graduating classes has been reflected in a strong demand for our 2004 graduates, all of whom found permanent employment in top financial institutions at least six months before their graduation, as follows:

Two graduates each at:

- Ph.D. Programs Princeton University
 Wharton School, University of Pennsylvania
- JP Morgan Chase Fixed income trading analyst in London
 Proprietary trading strategist/trader in New York

and one graduate each at:

- Dean & Company Financial consulting analyst in Washington, DC
- Goldman Sachs Proprietary trading analyst in New York
- Singapore Investment Co. Private equity analyst in Singapore
- McKinsey & Co. Business consulting analyst in Paris
- Mitsui Bank Officer, commodities trading in New York

We have three first year students, all of whom have summer internships as follows:

- BlackRock Quantitative asset management in New York
- Goldman Sachs Risk management in New York
- Merrill Lynch Derivatives trading in Hong Kong

The previous year, 2003, our graduates all found permanent employment as follows:

- Goldman Sachs 4 graduates Equity research in Hong Kong
Derivatives trading in London
Options trading in Chicago
Private Client Strategy in New York
- Hedge Funds 3 graduates Citadel in Chicago
Start up in London
Start up in New York
- Ph.D. Programs 3 graduates Princeton University
Northwestern University
London Business School
- Citicorp 2 graduates Currency trading in New York
Fixed income analysis in New York

and one graduate each at:

- Bank of Italy Banking supervision in Milan
- Derivatech Software for derivatives pricing in New York
- Empirical Research Partners Quantitative equity modeling in New York
- Gleacher & Co. Mergers and acquisitions in New York
- JP Morgan Chase Equity derivatives trading in New York
- Lehman Brothers Fixed income analytics MBS/ABS in New York
- Merrill Lynch Capital markets analytical associate in New York
- Morgan Stanley Emerging markets securities trading in New York
- NY Federal Reserve Banking supervision in New York
- Putnam Investments Quantitative asset management analysis in Boston
- Sanford Bernstein Quantitative asset management strategist in New York

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 2004, the meeting took place on May 13.

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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.

2004-05 Members

- Citadel Investments Group
- Citigroup
- Deutsche Bank
- Goldman Sachs
- JP Morgan Chase
- Lehman Brothers
- Merrill Lynch
- Moody's Corporation
- Morgan Stanley

Levels and Benefits

ASSOCIATE PARTNER: \$25,000/YEAR

- Annual Report of the BCF
- Opportunity to advertise internships and employment opportunities to both Undergraduate Certificate in Finance (254 in 2003-04) and Master in Finance students (13 in 2003-04)
- 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 web site which both list corporate affiliates and provide a hyperlink to each member's website

PARTNER: \$50,000/YEAR

- All of the previous benefits, plus:
- 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
- Invitation and two reserved seats for all Center for Economic Policy Studies symposia and special events. The day-long symposia brings to campus key leaders from business, government and academia. Recent events included:
 - **October 17-18, 2003 CEPS Symposium:** "Troubled Industries: What Role for Government?" Experts shared their views on the economic outlook and the role for government intervention in the telecommunications, airlines, and steel industries. The keynote address was delivered by Lawrence Lindsey, President of the Lindsey Group, Assistant to the President for Economic Policy during the George W. Bush administration, Chief Economic Advisor to candidate George W. Bush during the 2000 Presidential campaign, and Governor of the Federal Reserve from 1991-97. Saturday's sessions included an economic outlook by William Dudley (Goldman Sachs). The telecommunications session experts included Gerald Faulhaber (Wharton School), Reed Hundt (McKinsey & Co.), and Robert Willig (Princeton University). Participants for the airline industry session included Frank Lorenzo (Savoy Capital, former CEO of

Continental Airlines), Rodney Slater (Patton Boggs LLP, former US Secretary of Transportation), and Clifford Winston (The Brookings Institution). Meredith Broadbent (Office of the US Trade Representative), Gary Hufbauer (Institute of International Economics) and Terrence Straub (United States Steel Corporation) offered their expertise on the steel industry.

- **November 14, 2003 CEPS dinner:** Senator Paul S. Sarbanes shared his insights on the thinking behind the Sarbanes-Oxley Act of 2002. Following the presentation, Launny Steffens (Managing Director of the New York hedge fund, Spring Mountain Capital, and former Vice Chairman of Merrill Lynch) and Alan Blinder (Princeton University) discussed the responsibilities of directors of publicly traded companies and issues of executive compensation.
- **February 6, 2004 CEPS dinner:** John Reed spoke about his experience as interim chairman and chief executive officer of the NYSE.
- **March 26-27, 2004 Symposium:** "The Economic Policies of the Bush Administration." The Keynote address was delivered by Paul R. Krugman (*New York Times* columnist and Princeton University Professor of Economics and International Affairs). The Economic Outlook was given by Robert Dederick (RGD Economics). Health care issues were discussed by Stuart M. Butler (The Heritage Foundation), David Cutler (Harvard University), and Gail Wilensky (Project HOPE). The taxes session was handled by Kevin Hassett (American Enterprise Institute), Harvey Rosen (Council of Economic Advisers), and Joel Slemrod (University of Michigan Business School).
- **Upcoming CEPS Symposium: November 12-13, 2004:** "Understanding the Chinese Economic Miracle."

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.

Physical Space

Terrace	\$250,000
Director's Office	\$100,000
Graduate Student Suite	\$100,000

Academic Personnel

Senior Professorships (5 committed, 2 additional needed)	\$3,000,000
Senior Visiting Professorship (1 needed)	\$1,500,000
Postdoctoral Fellows (1 needed)	\$1,000,000
Junior Faculty Fellow (1 committed, 1 additional needed)	\$1,000,000

Fellowships

Graduate Fellowships (3 committed, 7 additional needed)	\$250,000
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Support of Financial Research and Teaching

Research and Course Development Funds	\$2,500,000
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ACKNOWLEDGEMENTS

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

Gerhard R. Andlinger '52	Oliver M. Langenberg '35
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