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EXPERIENCE

- 1998-present **Princeton University, Department of Economics and Bendheim Center for Finance** Princeton, New Jersey
2002-present: Otto A. Hack 1903 Professor of Finance and Economics.
1998-2002: Professor of Finance and Economics.
1998-present: Director, Bendheim Center for Finance.
Courtesy appointments in the Departments of Operations Research and Financial Engineering and the Program in Applied and Computational Mathematics.
Member of the Committee on Statistical Studies.
- 1993-1998 **University of Chicago, Graduate School of Business** Chicago, Illinois
Assistant Professor (1993-96), Associate Professor (1996-98), Professor of Finance (1998).

EDUCATION

- 1989-1993 **Massachusetts Institute of Technology (M.I.T.)** Cambridge, Mass.
Department of Economics
Ph.D. in Economics. Fields: Finance and Econometrics.
Ph.D. Thesis: "Nonparametric Functional Estimation with Applications to Financial Models." Thesis Advisors: Jerry A. Hausman, Andrew W. Lo. and Whitney K. Newey.
- 1987-1989 **Ecole Nationale de la Statistique et de l'Administration Economique (E.N.S.A.E.)** Paris, France
Diplôme de l'ENSAE and M.S. in Economics and Statistics.
M.S. Thesis: "Stock Prices with Bubbles, Fads or Sunspots."
- Institut d'Etudes Politiques de Paris** Paris, France
Diplôme de l'I.E.P. Concentration in International Relations and Economics.
- 1985-1987 **Ecole Polytechnique** Palaiseau, France
B.S. in Mathematics (Diplôme d'Ingénieur de l'Ecole Polytechnique). Curriculum included Mathematics, Computer Science, Physics and Engineering Science.
Undergraduate Thesis: "Entropy and Equity."
- 1983-1985 **Lycée Louis-le-Grand** Paris, France
Preparatory Classes to Grandes Ecoles Scientifiques. Concentration in Mathematics.
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HONORS AND AWARDS

- 2009 CORE Lectures, Louvain-la-Neuve, Belgium.
- 2008 Hermann Otto Hirschfeld Lectures, Humbolt University, Berlin.
- 2008 Fellow, *Journal of Econometrics*.
- 2008 Elected Fellow of the American Statistical Association.
- 2008-09 John Simon Guggenheim Memorial Foundation Fellow.
- 2006 Econometric Society Australasian Meeting *E.J. Hannan Lecture*.
- 2005 Econometric Society World Congress Invited Lecture.
- 2004 Elected Fellow of the Institute of Mathematical Statistics.
- 2003 Dennis J. Aigner Award for the best paper in applied econometrics published in the *Journal of Econometrics* in 2001 and 2002.
- 2003-2006 Director of the Western Finance Association.
- 2002 Elected Fellow of the Econometric Society.
- 2001 Awarded the 2001 Annual FAME Research Prize.
- 1998-2000 Awarded Alfred P. Sloan Research Fellowship.
- 2009-2012 NSF Grant: "Specification Analysis of Continuous-Time Models"
- 2005-2008 NSF Grant: "Nonparametric Transition Based-Tests for Markov Processes"
- 2004-2007 NSF Grant: "The Econometrics of Distinguishing Jumps from Volatility"
- 2001-2004 NSF Grant: "Econometric Methods for Discretely-Sampled Continuous-Time Models"
- 1998-2001 NSF Grant: "The Dynamics of Interest Rates: Specification Analysis"
- 1998 Cornerstone Research Award by the *Western Finance Association*.
- 1997 Michael J. Brennan Award for the best paper published in the *Review of Financial Studies* in 1996.
- 1997 Invited lecturer: *American Mathematical Society* and *Institute of Mathematical Statistics*.
- 1997, 98 Member of the Program Committee of the *Econometric Society*.
- 2000, 03, 04
- 1997 Named an "outstanding faculty" by *Business Week's* Guide to the Best Business Schools.
- 1995-present Faculty Research Fellow (1995-98), then Research Associate (1998-present), at the *National Bureau of Economic Research*.
- 1995 Emory Williams Award for Excellence in Teaching ("Teacher of the Year") at the Graduate School of Business, University of Chicago.
- 1994 Zellner Thesis Award by the *American Statistical Association*, honorable mention.
- May 1993 Invited to *The Review of Economic Studies* 1993 European Tour, designed to "promote the doctoral work of the most promising young researchers."
- 1989-93 Awarded M.I.T. Doctoral Fellowship.
- July 1989 *Lauréat avec les félicitations spéciales du Jury* of Institut d'Etudes Politiques de Paris (*Summa cum Laude*). Ranked first.

- July 1987 Awarded Ecole Polytechnique's Prize for Best Undergraduate Thesis of the Year (*Prix d'Option de l'Ecole Polytechnique*). B.S. *Summa cum Laude*.
- July 1985 Ranked first and third (top 1/1000) of applicants taking competitive entrance exams to France's "Grandes Ecoles" (Ecole Polytechnique, Ecole des Mines-Ponts and Ecole Centrale).
- July 1983 Baccalauréat Mention Très Bien (*Summa cum Laude*).

PUBLICATIONS

"Identifying the Successive Blumenthal-Gettoor Indices of a Discretely Observed Process," with Jean Jacod, forthcoming in the *Annals of Statistics*.

"Testing for Jumps in Noisy High Frequency Data," with Jean Jacod and Jia Li, forthcoming in the *Journal of Econometrics*.

"Analyzing the Spectrum of Asset Returns: Jump and Volatility Components in High Frequency Data," with Jean Jacod, forthcoming in the *Journal of Economic Literature*.

"How to Stop a Herd of Running Bears? Market Response to Policy Initiatives during the Global Financial Crisis," with Jochen Andritzky, Andreas Jobst, Sylwia Nowak and Natalia Tamirisa, forthcoming in the *Journal of International Economics*.

"Stationarity-Based Specification Tests for Diffusions When the Process is Nonstationary," with Joon Park, forthcoming in the *Journal of Econometrics*.

"Testing Whether Jumps Have Finite or Infinite Activity," with Jean Jacod, *Annals of Statistics*, 2011, 39, 1689–1719.

"Edgeworth Expansions for Realized Volatility and Related Estimators," with Lan Zhang and Per A. Mykland, *Journal of Econometrics*, 2011, 160, 190-203.

"Ultra High Frequency Volatility Estimation with Dependent Microstructure Noise," with Per A. Mykland and Lan Zhang, *Journal of Econometrics*, 2011, 160, 160-175.

"High Frequency Covariance Estimates with Noisy and Asynchronous Financial Data," with Jianqing Fan and Dacheng Xiu, *Journal of the American Statistical Association*, 2010, 105, 1504–1517.

"Nonparametric Tests of the Markov Hypothesis in Continuous-Time Models," with Jianqing Fan and Jiancheng Jiang, *Annals of Statistics*, 2010, 38, 3129-3163.

"Is Brownian Motion Necessary to Model High Frequency Data?," with Jean Jacod, *Annals of Statistics*, 2010, 38, 3093–3128.

"Estimating Affine Multifactor Term Structure Models Using Closed-Form Likelihood Expansions," with Robert Kimmel, *Journal of Financial Economics*, 2010, 98, 113–144.

"Operator Methods for Continuous-Time Markov Processes," with Lars P. Hansen and José A. Scheinkman, in *Handbook of Financial Econometrics*, edited by Y. Aït-Sahalia and L.P. Hansen, North Holland, 2010.

"Estimating and Testing Continuous-Time Models in Finance: The Role of Transition Densities," *Annual Review of Financial Economics*, 2009, 1, 341-359.

"Nonparametric Transition-Based Tests for Jump-Diffusions," with Jianqing Fan and Heng Peng, *Journal of the American Statistical Association*, 2009, 104, 1102-1116.

"Estimating the Degree of Activity of Jumps in High Frequency Data," with Jean Jacod, *Annals of Statistics*, 2009, 37, 2202-2244.

“Estimating Volatility in the Presence of Market Microstructure Noise: A Review of the Theory and Practical Considerations,” with Per Mykland, in *Handbook of Financial Time Series*, edited by Thomas Mikosch et al., Springer-Verlag, 2009.

“Portfolio Choice with Jumps: A Closed Form Solution,” with Julio Cacho-Diaz and Tom Hurd, *Annals of Applied Probability*, 2009, 19, 556–584.

“High Frequency Market Microstructure Noise Estimates and Liquidity Measures,” with Jialin Yu, *Annals of Applied Statistics*, 2009, 3, 422-457.

“Testing for Jumps in a Discretely Observed Process,” with Jean Jacod, *Annals of Statistics*, 2009, 37, 184-222.

“Out of Sample Forecasts of Quadratic Variation,” with Lorian Mancini, *Journal of Econometrics*, 2008, 147, 17-33.

“Fisher's Information for Discretely Sampled Lévy Processes,” with Jean Jacod, *Econometrica*, 2008, 76, 727–761.

“An Analysis of Hansen-Scheinkman Moment Estimators for Discretely and Randomly Sampled Diffusions,” with Per A. Mykland, *Journal of Econometrics*, 2008, 144, 1-26.

“Closed-Form Likelihood Expansions for Multivariate Diffusions,” *Annals of Statistics*, 2008, 36, 906-937.

“Volatility Estimators for Discretely Sampled Lévy Processes,” with Jean Jacod, *Annals of Statistics*, 2007, 35, 355-392.

“Estimating Continuous-Time Models Using Discretely Sampled Data,” Econometric Society World Congress Invited Lecture, in *Advances in Economics and Econometrics, Theory and Applications, Ninth World Congress*, edited by Richard Blundell, Persson Torsten and Whitney K. Newey, Econometric Society Monographs, Cambridge University Press, 2007.

“Maximum Likelihood Estimation of Stochastic Volatility Models,” with Robert Kimmel, *Journal of Financial Economics*, 2007, 83, 413–452.

“Saddlepoint Approximations for Continuous-Time Markov Processes,” with Jialin Yu, *Journal of Econometrics*, 2006, 134, 507-551.

“Likelihood Inference for Diffusions: A Survey,” in *Frontiers in Statistics: In Honor of Peter J. Bickel's 65th Birthday*, edited by Jianqing Fan and Hira L. Koul, Imperial College Press, 2006.

“A Tale of Two Time Scales: Determining Integrated Volatility with Noisy High-Frequency Data,” with Lan Zhang and Per A. Mykland, *Journal of the American Statistical Association*, 2005, 100, 1394-1411.

“How Often to Sample a Continuous-Time Process in the Presence of Market Microstructure Noise,” with Per A. Mykland and Lan Zhang, *Review of Financial Studies*, 2005, 18, 351-416.

“Estimators of Diffusions with Randomly Spaced Discrete Observations: A General Theory,” with Per A. Mykland, *Annals of Statistics*, 2004, 32, 2186-2222.

“Luxury Goods and the Equity Premium,” with Jonathan Parker and Motohiro Yogo, *Journal of Finance*, 2004, 59, 2959-3004.

“Disentangling Diffusion from Jumps,” *Journal of Financial Economics*, 2004, 74, 487-528.

“Nonparametric Option Pricing Under Shape Restrictions,” with Jefferson Duarte, *Journal of Econometrics*, 2003, 116, 9-47.

“The Effects of Random and Discrete Sampling When Estimating Continuous-Time Diffusions,” with Per A. Mykland, *Econometrica*, 2003, 71, 483-549.

“Telling From Discrete Data Whether the Underlying Continuous-Time Model is a Diffusion,” Journal of Finance, 2002, 57, 2075-2112.

“Maximum-Likelihood Estimation of Discretely Sampled Diffusions: A Closed-Form Approximation Approach,” Econometrica, 2002, 70, 1, 223-262. This paper was awarded the 1998 Cornerstone Research Award.

“Goodness-of-Fit Tests for Regression Using Kernel Methods,” with Peter Bickel and Thomas Stoker, Journal of Econometrics, 2001, 105, 2, 363-412.

“Variable Selection for Portfolio Choice,” with Michael Brandt, Journal of Finance, 2001, 56, 4, 1297-1351. This paper was awarded the 2001 Annual FAME Research Prize.

“Do Option Markets Correctly Price the Probabilities of Movement of the Underlying Asset?” with Yubo Wang and Francis Yared, Journal of Econometrics, 2001, 102, 67-110. This paper was awarded the Dennis J. Aigner for the best paper in applied econometrics published in the *Journal of Econometrics* in 2001 and 2002.

“Nonparametric Risk Management and Implied Risk Aversion,” with Andrew W. Lo, Journal of Econometrics, 2000, 94, 9-51.

“Transition Densities for Interest Rate and Other Nonlinear Densities,” Journal of Finance, 1999, 54, 1361-1395. Reprinted in: *Introduction to Mathematical Finance* (San Diego, CA, 1997), 65--99, Proc. Sympos. Appl. Math., 57, American Mathematical Society, Providence, RI, 1999.

“Nonparametric Estimation of State-Price-Densities Implicit in Financial Asset Prices,” with Andrew W. Lo, Journal of Finance, 1998, 53, 499-547.

“Dynamic Equilibrium and Volatility in Financial Asset Markets,” Journal of Econometrics, 1998, 84, 93-128.

“Testing Continuous-Time Models of the Spot Interest Rate,” Review of Financial Studies, 1996, 9, 385-426. This paper was awarded the Michael J. Brennan Award for the best paper published in the Review of Financial Studies in 1996.

“Nonparametric Pricing of Interest Rate Derivative Securities,” Econometrica, 1996, 64, 527-560 (lead article). Reprinted in *Modeling Stock Market Volatility: Bridging the Gap to Continuous Time*, edited by Peter E. Rossi, Academic Press, 1997.

“Entry-Exit Decisions of Foreign Firms and Import Prices,” Annales d'Economie et de Statistique, 1994, 34, 219-244.

“Updating Input-Output Tables,” with M. Balinski and G. Demange, in *Economic Essays in Honor of Edmond Malinvaud*, MIT Press, Cambridge, 1991.

BOOKS

Handbook of Financial Econometrics, 2 volumes, co-edited with Lars Peter Hansen, North Holland, 2010.

RESEARCH IN PROGRESS

“The Leverage Effect Puzzle: Disentangling Sources of Bias at High Frequency,” with Jianqing Fan and Yingying Li.

“Optimal Portfolio and Consumption Choice with Option-Implied State Prices,” with Michael W. Brandt.

“Modeling Financial Contagion Using Mutually Exciting Jump Processes,” with Julio Cacho-Diaz and Roger Laeven.

“Asymptotic Properties of Local Nonparametric Estimators in Possibly Nonstationary Diffusion Models,”
with Joon Y. Park.

TEACHING AND GRADUATE STUDENT ADVISING

Classes Taught	Financial Econometrics (Ph.D.) Time Series (Ph.D.) Financial Engineering: Mathematical Models of Option Pricing (Ph.D.). Portfolio Theory and Asset Management (Undergraduate, M.Fin.). Investments (M.Fin.).
Student Advising	Ph.D. Thesis Committees: Chair (12), Member (16). Undergraduate Senior Theses (6).

EDITORIAL BOARDS

2007-present	Associate Editor for <u>Econometrica</u> , <u>The Journal of Finance</u> and <u>The Annals of Applied Statistics</u> .
2003-2006	Editor, <u>Review of Financial Studies</u> .
2004-2006	Associate Editor for the <u>Annals of Statistics</u> .
2009	Co-Editor (with Lars Peter Hansen), <i>Handbook of Financial Econometrics</i> , North Holland.
2001-present	Associate Editor for the <u>Journal of Financial Econometrics</u> .
1998-present	Associate Editor for the <u>Journal of Econometrics</u> .
1996-present	Associate Editor for <u>Finance and Stochastics</u> .
1995-1999	Associate Editor for the <u>Review of Financial Studies</u> , the <u>Journal of Empirical Finance</u> and the <u>Journal of Securities Markets</u> .
