

## Curriculum Vitae of DARRELL DUFFIE

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### UNIVERSITY EDUCATION

Stanford University, Ph. D. (Engineering Economic Systems) (1984)

University of New England (Australia), Master of Economics (Economic Statistics) (1980)

University of New Brunswick (Canada), Bachelors of Science in Engineering (Civil Engineering) (1975)

### AWARDS AND HONORS

1985-86 NSF Research Fellowship  
1988-89 Batterymarch Fellowship  
1990-92 NSF Research Grant  
1992-93 Catalyst Institute Research Grant  
1994-95 Q Group Research Award  
1994-96 NSF Research Grant  
Fellow, Econometric Society  
1997 Smith-Breeden Distinguished Paper Prize, *Journal of Finance*  
2001 Graham and Dodd Award, *Financial Analysts Journal*  
2002 NYSE Prize for equity research, Western Finance Association  
2003 Distinguished teacher award, Doctoral Program, Graduate School of Business, Stanford University  
2003 Financial Engineer of the Year, International Association of Financial Engineering  
2004 Clarendon Lectures in Finance, Oxford University.  
2007 Princeton Lectures in Finance.  
2007 Elected Fellow of the American Academy of Arts and Sciences.  
2008 2011, Elected to the Council of the Econometric Society.  
2008 Nash Lecture, Carnegie-Mellon University.  
2009 Elected President of the American Finance Association.  
2010 Tinbergen Institute Finance Lectures, Duisenberg Institute.  
2011 Minerva Foundation Lectures, Columbia University.  
2015 Ross Prize, FARFE (with Jun Pan and Ken Singleton).  
2015 Fisher-Shultz Lecture, World Congress, Econometric Society.  
2016 AQR Prize (with Haoxiang Zhu).  
2017 Banca Lecture, Banca d'Italia.

### EMPLOYMENT

*1984-present:* Graduate School of Business, Stanford University  
*Current Position:* Dean Witter Distinguished Professor of Finance  
*On leave:* Mathematical Sciences Research Institute, University of California, Berkeley, 1985-1986; Université de Paris, Dauphine, 1998; University of Lausanne, 2007-2008; EPFL, 2015-2016.

RESEARCH  
INTERESTS

securities markets; derivatives; financial risk management; asset pricing theory; preferences under uncertainty, financial market innovation and security design; interest-rate modeling and fixed-income security pricing; over-the-counter markets; financial market infrastructure, central banking, market design.

BOOKS

*Security Markets: Stochastic Models*, Boston: Academic Press, 1988.

*Futures Markets*, Englewood Cliffs, New Jersey: Prentice-Hall, 1989. Japanese translation, Kinzai Publishing Company, 1994; Chinese translation, 1996.

*Dynamic Asset Pricing Theory*, Princeton University Press, 1992; Third Edition, 2001; French Translation, *Modèles Dynamiques d'Évaluation*, Paris: Presse Universitaire Française, 1993; Japanese Translation, Shinbun Press, 1998; portions appearing in Italian translation in *Il Principio di Arbitraggio*, edited by M. de Felice and E. F. Moriconi, Società Editrice Il Mulino, Bologna, 1996.

*Credit Risk: Pricing, Measurement, and Management*, with Kenneth J. Singleton, Princeton University Press, 2003.

*The Squam Lake Report: Fixing the Financial System*, co-authored with the Squam Lake Group, Princeton University Press, 2010.

*How Big Banks Fail — And What to Do About It*, Princeton University Press, 2010.

*Measuring Corporate Default Risk*, Oxford University Press, 2011.

*Dark Markets: Asset Pricing and Information Transmission in Over-The-Counter Markets*, Princeton University Press, 2012.

RESEARCH  
ARTICLES

"Implementing Arrow-Debreu Equilibria by Continuous Trading of Few Long-Lived Securities," (with Chi-fu Huang), *Econometrica*, vol. 53 (1985), pp. 1337-1356, forthcoming in reprinted form in *Continuous-Time Finance*, edited by Stephen Schaefer, London: Edward Elgar, 2000.

"Competitive Equilibria in General Choice Spaces," *Journal of Mathematical Economics*, vol. 14 (1986), pp. 1-23.

"Stochastic Equilibria: Existence, Spanning Number, and the 'No Expected Financial Gains From Trade' Hypothesis," *Econometrica*, vol. 54 (1986), pp. 1161-1184.

"Predictable Representation of Martingale Spaces and Changes of Probability Measure," *Séminaires de Probabilité XIX*, edited by J. Azéma and M. Yor, *Lecture Notes in Mathematics Number 1123*, (1985) Springer-Verlag: Berlin, pp. 278-285.

"Multiperiod Security Markets with Differential Information: Martingales and Resolution Times" (with Chi-fu Huang), *Journal of Mathematical Economics*, vol. 15 (1986), pp. 283-303.

"Stochastic Equilibria with Incomplete Financial Markets", *Journal of Economic Theory*, vol. 41 (1987), pp. 405-416. Corrigendum, vol. 49 (1989), p. 384.

- "Equilibrium in Incomplete Markets: I. A Basic Model of Generic Existence"** (with Wayne Shafer), *Journal of Mathematical Economics*, vol. 13 (1985), pp. 285-300, forthcoming in reprinted form in *General Equilibrium Theory*, edited by Gérard Debreu, Edward Elgar Publishing, Cheltenham, England.
- "Equilibrium in Incomplete Markets: II. Generic Existence in Stochastic Economies"** (with Wayne Shafer) *Journal of Mathematical Economics*, vol. 15 (1986), pp. 199-216, forthcoming in reprinted form in *General Equilibrium Theory*, edited by Gérard Debreu, Edward Elgar Publishing, Cheltenham, England.
- "Intertemporal Arbitrage and the Markov Valuation of Securities"** (with Mark Garman), *Cuadernos Economicos de ICE*, vol. 49 (1991), pp. 37-60.
- "An Extension of the Black-Scholes Model of Security Valuation,"** *Journal of Economic Theory*, Vol. 46 (1988), 194-204.
- "Optimal Hedging and Equilibrium in a Dynamic Futures Market"** (with Matthew O. Jackson), *Journal of Economic Dynamics and Control*, Vol. 14 (1990), 21-33.
- "Optimal Innovation of Futures Contracts"** (with Matthew O. Jackson) *Review of Financial Studies*, Vol. 2 (1989), pp. 275-296.
- "Money in General Equilibrium Theory,"** Chapter 3, *Handbook of Monetary Economics*, Volume 1 (1990), edited by B. M. Friedman and F. H. Hahn, Elsevier Science Publishers, Amsterdam, pp. 81-100.
- "The Consumption-Based Capital Asset Pricing Model"** (with Bill Zame), *Econometrica*, Vol. 57 (1989), pp. 1279-1298.
- "Transactions Costs and Portfolio Choice in a Discrete-Continuous Time Setting"** (with Tong-Sheng Sun), *Journal of Economic Dynamics and Control*, Vol. 14 (1990), 35-51.
- "The Risk-Neutral Value of the Early Arbitrage Option",** *Advances in Futures and Options Research*, vol. 4 (1990), pp. 107-110.
- "Corporate Financial Hedging with Proprietary Information"** (with Peter Demarzo), *Journal of Economic Theory*, Vol. 53 (1991), pp. 261-286.
- "From Discrete to Continuous Time Finance: Weak Convergence of the Financial Gain Process"** (with Philip Protter), *Mathematical Finance*, Vol. 2 (1992), pp. 1-16.
- "Mean-Variance Hedging in Continuous Time"** (with Henry Richardson), *Annals of Applied Probability*, Vol. 1 (1991), 1-15.
- "Pricing Continuously Resettled Contingent Claims"** (with Richard Stanton), *Journal of Economic Dynamics and Control*, Vol. 16 (1992), pp. 561-574.

- "Stochastic Differential Utility,"** (with Larry Epstein), *Econometrica*, Vol. 60 (1992), pp. 353-394.
- "PDE Solutions of Stochastic Differential Utility"** (with P.-L. Lions) *Journal of Mathematical Economics*, Vol. 21 (1992). 577-606.
- "Asset Pricing with Stochastic Differential Utility"** (with Larry Epstein), *Review of Financial Studies*, Vol. 5 (1992), pp. 411-436.
- "Simulated Moments Estimation of Markov Models of Asset Prices"** (with Ken Singleton), *Econometrica*, Vol. 61 (1993), pp. 929-952.
- "Optimal Investment with Undiversifiable Income Risk"** (with Thaleia Zariphopoulou), *Mathematical Finance*, Vol. 3 (1993), pp. 135-148.
- "Arbitrage Pricing of Russian Options and Perpetual Lookback Options"** (with J. Michael Harrison), *Annals of Applied Probability*, Vol. 3 (1993), 641-651.
- "Asset Pricing in Incomplete Markets,"** *Hitotsubashi Journal of Economics*, Vol. 34 (1993), 139-148.
- "Continuous-Time Security Pricing: A Utility Gradient Approach"** (with Costis Skiadas), *Journal of Mathematical Economics*, Vol. 23 (1994), 107-132.
- "Efficient and Equilibrium Allocations with Stochastic Differential Utility,"** (with Pierre-Yves Geoffard and Costis Skiadas), *Journal of Mathematical Economics*, Vol. 23 (1994), 133-146.
- "Stationary Markov Equilibria"** (with John Geanakoplos, Andreu Mas-Colell, and Andy McLennan), *Econometrica*, Vol. 62 (1994), 745-782.
- "Volatility in Energy Prices,"** with S. Gray and P. Hoang, in *Managing Energy Price Risk*, edited by Lou Pai and Peter Field, Risk Publications, 1995, revised for second edition, 1999, pp. 273-290.
- "Black's Consol Rate Conjecture"** (with Jin Ma and Jiongmin Yong), *Annals of Applied Probability*, Vol. 5 (1995), pp. 356-382.
- "Hedging in Incomplete Markets with HARA Utility"** (with Wendell Fleming, Mete Soner, and Thaleia Zariphopoulou), *Journal of Economic Dynamics and Control* Vol. 21 (1997), pp. 753-782.
- "Efficient Monte Carlo Estimation of Security Prices"** (with Peter Glynn), *Annals of Applied Probability* Vol. 5 (1996), pp. 897-905.
- "Corporate Incentives for Hedging and Hedge Accounting"** (with Peter DeMarzo), *Review of Financial Studies*, Vol. 8 (1995), 743-772.
- "Special Repo Rates,"** *Journal of Finance*, Vol. 51, (1996) 493-526.

- "Asset Pricing with Heterogeneous Consumers"** (with George Constantinides), *Journal of Political Economy*, Vol. 104 (1996), pp. 219-240.
- "A Term Structure Model with Preferences for the Timing of the Resolution of Uncertainty"** (with Mark Schroder and Costis Skiadas), *Economic Theory*, Vol. 9 (1997), pp. 3-22.
- "A Yield-Factor Model of Interest Rates"** (with Rui Kan), *Mathematical Finance* Volume 6 (1996) pp. 379-406, reprinted in *The New Interest Rate Models*, London: Risk Books, 2000; and in *Options Markets*, edited by G. Constantinides and A. Malliaris, London: Edward Elgar, forthcoming.
- "Swap Rates and Credit Quality"** (with Ming Huang), *Journal of Finance*, Volume 51 (1996) pp. 921-950.
- "Recursive Valuation of Defaultable Securities and the Timing of the Resolution of Uncertainty"** (with Mark Schroder and Costis Skiadas), *Annals of Applied Probability*, Vol. 6 (1996) pp. 1075-1090.
- "An Econometric Model of the Term Structure of Interest Rate Swap Yields"** (with Ken Singleton), *Journal of Finance*, Vol. 52, pp. 1287-1321, forthcoming in reprinted form in *Options Markets*, edited by G. Constantinides and A. Malliaris, London: Edward Elgar, 2000.
- "A Liquidity-Based Model of Security Design"** (with Peter DeMarzo), *Econometrica*, Vol. 67 (1999), pp. 65-99.
- "Modeling Term Structures of Defaultable Bonds"** (with Ken Singleton), *Review of Financial Studies*, Vol. 12 (1999), 687-720.
- "Credit Swap Valuation,"** *Financial Analysts Journal*, January-February, 1999, pp. 73-87, reprinted in *Credit Risk: Models and Management*, edited by David Shimko, London: Risk Books, 1999, pp. 245-258, and to be reprinted in *International Securities*, edited by George Philippatos and Gregory Koutmos, The International Library of Critical Writings in Financial Economics, Senior Editor, Richard Roll, Edward Elgar Publishing, 2000.
- "Transform Analysis and Asset Pricing for A ne Jump-Di usions,"** (with Jun Pan and Ken Singleton), *Econometrica*, Vol. 68 (2000), pp. 1343-1376.
- "Floating-Fixed Credit Spreads,"** (with Jun Liu), *Financial Analysts Journal*, May-June, 2001, pp. 76-87.
- "Term Structures of Credit Spreads with Incomplete Accounting Information,"** (with David Lando), *Econometrica*, Vol. 69 (2001), pp. 633-664.
- "Analytical Value-at-Risk with Jumps and Credit Risk,"** (with Jun Pan), *Finance and Stochastics*, Vol. 5 (2001), pp. 155-180.
- "Risk and Valuation of Collateralized Debt Obligations,"** (with Nicolae Gârleanu), *Financial Analysts Journal*, January-February, 2001, pp. 41-62, winner, Graham and Dodd Scroll Award.

- "Universal State Prices and Asymmetric Information,"** (with Rui Kan), *Journal of Mathematical Economics*, Vol. 38 (2002), pp. 191-196.
- "Securities Lending, Shorting, and Pricing,"** (with Nicolae Gârleanu and Lasse Pedersen), *Journal of Financial Economics*, Vol. 66 (2002), pp. 307-339. (NYSE Award, Best Paper, Equity Analysis)
- "Liquidation Risk,"** (with Alexandre Ziegler), *Financial Analysts Journal*, May-June 2003, pp 42-51.
- "Modeling Sovereign Yield Spreads: A Case Study of Russian Debt,"** (with Lasse Pedersen and Ken Singleton), *Journal of Finance*, Vol. 58 (2003), pp. 119-159.
- "A ne Processes and Applications in Finance,"** (with Damir Filipovic and Walter Schachermayer), *Annals of Applied Probability*, Vol. 13 (2003), 984-1053.
- "Market Pricing of Deposit Insurance,"** (with Robert Jarrow, Amiyatosh Purnanandam, and Wei Yang) *Journal of Financial Services Research*, Vol. 24 (2003), 93-119.
- "Large Portfolio Losses,"** (with Amir Dembo and Jean-Dominique Deuschel), *Finance and Stochastics*, Vol. 8 (2004), pp. 3-16.
- "Estimation of Continuous-Time Markov Processes Sampled at Random Times,"** (with Peter Glynn), *Econometrica* Vol. 72 (2004), pp. 1773-1808.
- "Over-The-Counter Markets,"** (with Nicolae Gârleanu and Lasse Pedersen), *Econometrica*, Volume 73 (2005), pages 1815-1847.
- "Multi-Period Corporate Default Prediction with Stochastic Covariates,"** (with Leandro Saita and Ke Wang), *Journal of Financial Economics*, Volume, 83 (2007), 635-665.
- "Common Failings: How Corporate Defaults are Correlated,"** (with Sanjiv Das, Nikunj Kapadia, and Leandro Saita), *Journal of Finance*, Volume 62 (2007), 93-117.
- "The Existence of Independent Random Matching,"** (with Yeneng Sun), *Annals of Applied Probability*, Volume 17 (2007), 386-419.
- "Valuation in Over-The-Counter Markets,"** (with Nicolae Gârleanu and Lasse Pedersen), *Review of Financial Studies*, 2007, Vol. 20, pp.1865-1900.
- "Information Percolation in Large Markets,"** (with Gustavo Manso), *American Economic Review, Papers and Proceedings*, 2007, Vol. 97, pp. 203-209.
- "Systemic Dynamics in the Federal Funds Market,"** (with Adam Ashcraft), *American Economic Review, Papers and Proceedings*, 2007, Vol. 97, pp. 221-225.
- "Frailty Correlated Default,"** (with Andreas Eckner, Guillaume Horel, and Leandro Saita), *Journal of Finance*, 2009, Vol. 64, pp. 2089-2124.

- "Information Percolation,"** (with Gaston Giroux and Gustavo Manso), *American Economics Journal: Microeconomics* 2010, Vol. 2, pp. 100-111.
- "Information Percolation with Equilibrium Search Dynamics,"** (with Semyon Malamud and Gustavo Manso), *Econometrica* 2009, Vol. 77, pp. 1513-1574.
- "The Relative Contributions of Private Information Sharing and Public Information Releases to Information Aggregation"** (with Semyon Malamud and Gustavo Manso), *Journal of Economic Theory* 2010, Vol. 145, pp. 1574-1601.
- "Asset Price Dynamics with Slow-Moving Capital,"** Presidential Address, *Journal of Finance* 2010, Vol. 65, pp. 1238-1268.
- "Does a Central Clearing Counterparty Reduce Counterparty Risk?"** (with Haoxiang Zhu), *Review of Asset Pricing Studies* 2011, Vol. 1, pp. 74-95.
- "The Exact Law of Large Numbers for Independent Random Matching"** (with Yeneng Sun), *Journal of Economic Theory* 2012, Vol. 147, pp. 1105-1139.
- "Capital Mobility and Asset Pricing"** (with Bruno Strulovici), *Econometrica* 2012, Vol. 80, pp. 2469-2509.
- "Information Percolation in Segmented Markets"** (with Semyon Malamud and Gustavo Manso), *Journal of Economic Theory* 2015, Vol. 157, pp. 1130-1158.
- "Central Clearing and Collateral Demand"** (with Martin Scheicher and Guillaume Vuillemeys), *Journal of Financial Economics*, 2015, Vol. 116, pp. 237-256.
- "Benchmarks in Search Markets"** (with Piotr Dworczak and Haoxiang Zhu), *Journal of Finance*, 2017, Vol. 72, pp. 1983-2084.
- "Size Discovery"** (with Haoxiang Zhu), *Review of Financial Studies*, 2017, Vol. 30, pp. 1095-1150.
- "Dynamic Directed Random Matching"** (with Lei Qiao and Yeneng Sun), forthcoming, *Journal of Economic Theory*, 2017.
- "Funding Value Adjustments,"** (with Leif Andersen and Yang Song), forthcoming, *Journal of Finance*, 2017.

OTHER  
PUBLICATIONS

- "Money in General Equilibrium Theory,"** Chapter 3, *Handbook of Monetary Economics*, Volume 1 (1990), edited by B. M. Friedman and F. H. Hahn, Elsevier Science Publishers, Amsterdam, pp. 81-100.
- "Arrow and General Equilibrium Theory"** (with Hugo Sonnenschein), *Journal of Economic Literature*, Vol. 27 (1989), pp. 565-598.

- "The Theory of Value in Security Markets,"** *The Handbook of Mathematical Economics, Volume IV*, Chapter 31, edited by Werner Hildenbrand and Hugo Sonnenschein, North-Holland (1991), 1615-1682.
- " 'Frontiers of Modern Financial Theory, Volume 1, Theory of Valuation,' A Review,"** *Review of Financial Studies*, Vol. 2 (1989), pp. 267-272.
- "The Nature of Incomplete Security Markets,"** *Advances in Economic Theory, Volume 2*, edited by Jean-Jacques La ont, Cambridge University Press (1992), pp. 214-262.
- "Intertemporal General Equilibrium: Comment,"** *Value and Capital, Fifty Years Later*, edited by Lionel McKenzie and Stefano Zamagni, London: Macmillan (1991), 461-468.
- "Spanning in Security Markets" in** *The New Palgrave Dictionary of Money and Finance*, (1992) edited by P. Newman, M. Milgate, and J. Eatwell, London: The Macmillan Press.
- "The Modigliani-Miller Theorem," in** *The New Palgrave Dictionary of Money and Finance*, (1992) edited by P. Newman, M. Milgate, and J. Eatwell, London: The Macmillan Press.
- "Martingales, Arbitrage, and Portfolio Choice,"** *Proceedings of The European Congress of Mathematics, Volume II, Invited Lectures*, edited by A. Joeseeph and R. Rentschler, Boston: Birkhäuser Press, 1994, pages 3-21.
- "Asset Pricing in Incomplete Markets,"** *Hitotsubashi Journal of Economics*, Vol. 34 (1993), 139-148.
- "Debt Management and Interest Rate Risk,"** *Risk Management: Challenges and Solutions*, ed. W. Beaver and G. Parker, McGraw-Hill Publishing Company, 1994.
- "Incomplete Security Markets with Infinitely Many States: An Introduction"** *Journal of Mathematical Economics*, Vol. 26 (1995), 1-8.
- "Multi-Factor Interest Rate Models,"** with Rui Kan, *Philosophical Transactions of The Royal Society, Series A, Volume 347* (1993), pp. 577-586, reprinted in *Mathematical Models in Finance*, Chapman and Hall, 1995.
- "Financial Market Innovation and Security Design"** (with Rohit Rahi), *Journal of Economic Theory*, Vol. 65 (1995), pp. 1-42.
- "State-Space Models of the Term Structure of Interest Rates,"** in H. Körezlioglu, B. Øksendal, and A. Üstünel, editors, *Stochastic Analysis and Related Topics V: The Silivri Workshop, 1994*, Boston: Birkhäuser, 1996, republished in *Vasicek and Beyond*, edited by Lane Hughston (RISK: London, 1997).
- "An Overview of Value at Risk,"** (with Jun Pan), *Journal of Derivatives*, April, 1997, pp. 7-49, forthcoming in reprinted form in *Options Markets*, edited by G. Constantinides and A. G. Malliaris, London: Edward Elgar, 2000.



**"Black, Merton, and Scholes — Their Central Contributions to Economics,"** *Scandinavian Journal of Economics*, Vol. 11 (1998), pp. 411-424.

**"Measuring and Marking Counterparty Risk,"** (with Eduardo Canabarro), in, *ALM of Financial Institutions*, edited by Leo Tilman, Institutional Investor Books (2004), Chapter 9.

**"Challenges to A Policy Treatment of Speculative Trading Motivated by Differences in Beliefs,"** forthcoming, *Journal of Legal Studies*, 2014.

**"Systemic Risk Exposures: A 10-by-10-by-10 Approach,"** in *Risk Topography: Systemic Risk and Macro Modeling*, edited by Markus K. Brunnermeier and Arvind Krishnamurthy, National Bureau of Economic Research and University of Chicago Press, 2014.

**"Financial Market Infrastructure: Too Important to Fail,"** in *Across the Divide: New Perspectives on the Financial Crisis*, edited by Martin Bailey and John Taylor, Hoover Institution and Brookings Institute, 2014.

**"Replumbing Our Financial System Uneven Progress,"** *International Journal of Central Banking* Volume 9, 2013, Supplement 1: 251-280.

**"Challenges to A Policy Treatment of Speculative Trading Motivated by Differences in Beliefs,"** *Journal of Legal Studies*, Volume 43 (S2) (2014), pp. S173-S182.

**"Market Participants Group on Reforming Interest Rate Benchmarks, Final Report"** (with the Market Participants Group), Financial Stability Board, March 2014.

**"Discussion of John Cochrane's 'A New Structure for U.S. Federal Debt,'"** in *The 13 Trillion Dollar Question: Managing the U.S. Federal Debt*, edited by David Wessel, Brookings Institution Press, 2015.

**"Resolution of Failing Central Counterparties,"** in *Making Failure Feasible: How Bankruptcy Reform Can End 'Too Big To Fail'*, edited by Kenneth Scott and John E. Taylor, Hoover Institution Press, 2015.

**"Reforming LIBOR and Other Financial-Market Benchmarks"** (with Jeremy Stein), *Journal of Economic Perspectives*, Vol. 29 (Spring 2015), pp. 191-212.

**"Passthrough Efficiency in the Fed's New Monetary Policy Setting"** (with Arvind Krishnamurthy), in Richard A. Babson, editor, *Designing Resilient Monetary Policy Frameworks for the Future, A Symposium Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 25-27, 2016*, Federal Reserve Bank of Kansas City, pages 21-102.

**"Financial Regulatory Reform After the Crisis: An Assessment,"** forthcoming, *Management Science*, 2016 ECB Forum on Central Banking, Sintra, Portugal, June, 2016.

**"Disunion Approximation in Arrow's Model of Exhaustible Resources,"** (with Michael Taksar) Technical Report Number 416, Stanford Institute for Mathematical Studies in The Social Sciences (Economics Series), Stanford University, August, 1983.

**"Price Operators: Extensions, Potentials, and the Markov Valuation of Securities",** Research Paper No. 813, Graduate School of Business, Stanford University, July, 1985.

"Stochastic Production-Exchange Equilibria" (with Chi-Fu Huang), Research Paper, Graduate School of Business, Stanford University, May 1986.

"Equilibrium and The Role of the Firm in Incomplete Markets" (with Wayne Shafer), Graduate School of Business, Stanford University, August, 1986.

"A Liquidity-Based Model of Asset-Backed Security Design" (with Peter DeMarzo), Working Paper, Kellogg Graduate School of Management, Northwestern University, November, 1993.

"Asymptotic Efficiency of Hansen-Scheinkman and Resolvent Estimators of Ornstein-Uhlenbeck Processes," (with Qiang Dai and Peter Glynn), Working Paper, Graduate School of Business, Stanford University, 1997.

"First-to-Default Valuation," Working Paper, Université de Paris, Dauphine, and Graduate School of Business, Stanford University, 1998.

"Defaultable Term Structure Models with Fractional Recovery of Par," Working Paper, Graduate School of Business, Stanford University, 1998.

"Simulating Correlated Defaults," (with Ken Singleton), Working Paper, Graduate School of Business, Stanford University, 1998.

"Reforming Money Market Funds," January, 2011, The Squam Lake Group.

BOARDS

*Journal of Mathematical Economics*, **July, 1988 to February, 1996.**  
*Advances in Futures and Options Research*, **May, 1989 to May 1991.**  
*Annals of Applied Probability*, **September, 1989 to May, 1994.**  
*Economic Theory*, **December, 1989 to February, 1996.**  
*Journal of Economic Theory*, **1986 to 1999.**  
*Mathematical Finance*, **October, 1989 to January, 2001.**  
*Econometrica*, **July, 1990 to July, 2014.**

Squam Lake Working Group, Member.  
Stanford Institute of Economic Policy Research (SIEPR), Senior Fellow, 2009 to present.  
Society of Financial Econometrics (SoFiE), Council, 2009 to present.  
Swiss Finance Institute, Scientific Council, 2010 to present.  
Duisenberg Institute, Scientific Council, 2010 to 2015.  
Initiative on Global Markets (IGM), University of Chicago, Experts Panel, 2010-present.  
Stanford University, Financial Institutions Resolution Group, 2009-present.  
SWIFT Institute Advisory Council, 2012-present.  
American Academy of Arts and Sciences, Fellow. 2010-present.  
Asian Bureau of Finance and Economics Research, Senior Academic Fellow.  
Bureau of Finance and Economics Research, Senior Academic Fellow.  
Member, World Economic Forum Global Agenda Council on the Global Financial System.  
World Economic Forum, The Role of Financial Services in Society, Steering Committee.  
Market Participants Group on Reference Rate Reform (chair).  
P.R.I.M.E. Finance Foundation, Panel of Recognized International Market Experts in Finance. December.  
Institute for Global Finance, University of New South Wales, Senior Fellow.  
Vox China, Advisory Board.  
Risk Advisory Council, Global Risk Institute, Canada.

CORPORATE  
BOARDS

iShares Funds and Trusts, San Francisco, 2008-2011.  
Moody's Corporation, New York, October 2008 to present.

OTHER

Bank One and I.R.S., Chicago (expert testimony, valuation of swaps).  
Board of Directors, A nium Fund, London.

COMPENSATED

International Monetary Fund, Washington, D.C. (credit risk).  
Citigroup, New York (economic capital).

ACTIVITIES

Merrill Lynch, New York (risk management).  
Paloma Partners, Greenwich CT (risk management).

2003-2017

Ixis, Paris (credit markets).  
Schering-Plough, Kenilworth NJ (asset valuation).  
MBIA, New York (credit risk management).  
Bombardier, Toronto (corporate debt valuation).  
Moody's, Academic Research and Advisory Committee, New York.  
Credit Suisse, New York (financial markets and risk management), New York.  
Quinn Emanuel, New York, (consulting and expert witness testimony, credit risk corporate debt valuation, credit derivatives, interest-rate swaps).  
New York State Tax Authority (repurchase agreements), New York.  
Cantor Fitzgerald (inter-dealer broker markets), New York.  
Independent Health Care Trusts for UAW Retirees of General Motors Corporation and of Ford Motor Corporation, (exercise of equity options), Detroit.  
State Street Bank (speech to investor conference), Boston.  
PayNet Inc. (estimation of default probabilities), Chicago.  
Matterhorn Investment Management (global capital markets), London.  
Cantor Fitzgerald (interdealer brokerage of treasuries), New York.  
Public Prosecutor of Milan (valuation of swap agreements), Milan Italy.

Federal Reserve Bank of Chicago (central clearing counterparties), Chicago.  
Kepos Capital (academic advisory board), New York.  
Lehman Estate (consultation on bankruptcy-related issues), New York.  
Incisive Media (public speaking).  
Rothwell, Figg, Ernst & Manbeck (consultation on intellectual property rights), Washington DC,  
Sansome Capital (consultation on global capital markets), San Francisco.  
Och-Zi Management LP (consultation on hedge fund risk management), New York.  
Government of Canada, Department of Justice (Capital Markets Stability Act), Ottawa.  
Zurich Financial Services (economic risk), Zurich.  
Municipal Securities Rulemaking Board (financial benchmarks), Washington DC.

This curriculum vitae is current as of December, 2017.