

Agostino Capponi

CONTACT INFORMATION	<i>Assistant Professor</i> Department of Industrial Engineering and Operations Research Columbia University 535G S. W. Mudd Building New York NY 10027, USA	<i>Voice: +1(212) 854-4334</i> <i>Email: ac3827@columbia.edu</i>
EDUCATION	California Institute of Technology , Department of Computing & Mathematical Sciences, Pasadena, California, USA Ph.D., June 2009 <ul style="list-style-type: none">• Title: <i>Credit Risk and Non-linear Filtering: Computational Aspects and Empirical Evidence</i>• Advisor: Professor Jakša Cvitanić M.S., GPA 4.0/4.0, June 2006 University of Rome “La Sapienza” , Department of Information Sciences, Rome, Italy B.S., <i>Magna cum Laude</i> , December 2001	
PROFESSIONAL EXPERIENCE	<i>Tenure-Track Assistant Professor</i> Industrial Engineering and Operations Research Department Columbia University , New York, NY. <i>Consultant</i> Office of the Chief Economist U.S. Commodity Futures Trading Commission , New York, NY. <i>Tenure-Track Assistant Professor</i> Department of Applied Mathematics and Statistics Johns Hopkins University , Baltimore, MD. <i>Tenure-Track Assistant Professor</i> Department of Industrial Engineering Purdue University , West Lafayette, IN. <i>Visiting Assistant Professor</i> Swiss Institute of Finance École Polytechnique Fédérale de Lausanne , Lausanne, Switzerland. <i>Full-Time Associate, Derivatives Analysis</i> Goldman Sachs International , London, U.K. <i>Instructor</i> Department of Industrial and Systems Engineering University of Southern California , Los Angeles, California.	Aug. 2014 – present Feb. 2016 – present Aug. 2013 – August 2014 Aug. 2010 – July 2013 June 2011 – July 2011 Aug. 2009 – Aug. 2010 May 2009 – July 2009
PATENTS, GRANTS, & AWARDS	Bar-Ilan Prize . General Prize for Research in Financial Mathematics, 2016. Regular Prize, SIFI (Systemic Important Financial Institutions Challenge) . MIT Center for Finance and Policy and the Harvard Crowd Innovation Laboratory, 2016. (\$500).	

DARPA. Sole PI. A Mathematical Framework for Complex Human-Machine Interaction Systems, 2016-2017 (\$175,000).

Global Risk Institute. Regular grant: Sole PI. Centralized Trading: Collateral, Risk Shifting, and Competition, 2016-2018. (\$119,934).

OCP Group. Private Grant: CO-PI (joint with G. Iyengar and J. Sethuraman), 2015-2016 (\$285,269).

Institute for New Economic Thinking Award. Regular grant: Sole PI. Dynamic Contagion Mechanisms in Financial Networks, 2013-2014. (\$75,000). Acceptance rate: 8%.

IFM Award. Institute for Financial Markets, 2012. Selected among the top five by the Advisory Committee of the Clearing Corporation Foundation (\$15,000).

Best student Paper Award. IEEE International Conference on Computational Intelligence for Financial Engineering (CIFER'09).

World Patent. A. Capponi. "Partition process, tracking methods and systems using it". Publication info: WO2005059589-2005-06-30. Publication date: 06/30/2005.

Fellowship. Marie Curie fellowship, 2003-2004 (€48,000).

PUBLICATIONS

Refereed Journal Publications

- "Risk Sensitive Asset Management and Cascading Defaults". *Mathematics of Operations Research*. Forthcoming (with J. Birge and L. Bo)
- "Optimal Investment under Information Driven Contagious Distress". *SIAM Journal on Control and Optimization*. Forthcoming (with L. Bo)
- "Arbitrage-Free XVA". *Mathematical Finance*. Forthcoming (with M. Bichuch and S. Sturm)
- "Optimal Credit Investment with Borrowing Costs". *Mathematics of Operations Research*. Forthcoming. Published on-line, December 8, 2016 (with L. Bo)
- "Dynamic Investment and Counterparty Risk". *Applied Mathematics and Optimization*. Forthcoming. Published on-line, June 9, 2016 (with L. Bo)
- "Systemic Influences on Optimal Equity-Credit Investment". *Management Science*. Forthcoming. Published on-line, June 23, 2016 (with C. Frei)
- "Robust Optimization of Credit Portfolios". *Mathematics of Operations Research*. Forthcoming. Published on-line, September 30, 2016 (with L. Bo)
- "Liability Concentration and Losses in Financial Networks". *Operations Research* 64(5), pp. 1121-1134, 2016 (with P.C. Chen and D.D. Yao)
- "Optimal Investment in Credit Derivatives Portfolio under Contagion Risk". *Mathematical Finance* 26(4), pp. 785-834, 2016 (with L. Bo)
- "Price Contagion through Balance Sheet Linkages". *Review of Asset Pricing Studies* 5(2), pp. 227-253, 2015 (with M. Larsson)
- "Systemic Risk Mitigation in Financial Networks". *Journal of Economic Dynamics and Control* 58(15), pp. 152-166, 2015. (with P.C. Chen)
- "Dynamic Contracting: Accidents Lead to Nonlinear Contracts". *SIAM Journal of Financial Mathematics* 6(1), pp. 959-983, 2015. (with C. Frei)

- “Systemic Risk in Interbanking Networks”. *SIAM Journal of Financial Mathematics*, 6(1), pp. 386-424, 2015 (with L. Bo)
- “Counterparty Risk for CDS: Default Clustering Effects”. *Journal of Banking and Finance* 52, pp. 29-42, 2015. (with L. Bo)
- “Dynamic Credit Investment in Partially Observed Markets. *Finance and Stochastics* 19(4), pp. 891-939, 2015. (with J.E. Figueroa-López and A. Pascucci)
- “Pricing Vulnerable Claims in a Lévy Driven Model”. *Finance and Stochastics* 18(4), pp. 775-789, 2015. (with S. Pagliarani and T. Vargiolu)
- “Default and Systemic Risk in Equilibrium”. *Mathematical Finance*, 25(1), 51-76, 2015. (with M. Larsson)
- “Bilateral Credit Valuation Adjustment for Large Credit Derivatives Portfolios”. *Finance and Stochastics* 18(2), pp. 431-482, 2014. (with L. Bo)
- “Pricing and Semi-Martingale Representations of Vulnerable Contingent Claims in Regime-Switching Markets”. *Mathematical Finance* 24(2), pp. 250-288, 2014. (with J.E. Figueroa-López and J. Niesen)
- “Dynamic Portfolio Optimization with a Defaultable Security and Regime Switching”. *Mathematical Finance*, 24(2), 207-249, 2014. (with J.E. Figueroa-López)
- “Arbitrage-free Bilateral Counterparty Risk Valuation under Collateralization and Application to Credit Default Swaps”. *Mathematical Finance*, 24(1), pp. 125-146, 2014. Short version appeared in *Risk*, pp. 85-90, 2010. (with D. Brigo and A. Pallavicini)
- “Optimal Contracting with Effort and Misvaluation”. *Mathematics and Financial Economics* 7 (1), 93-128, 2013. (with J. Cvitanić and T. Yolcu)
- “A Variational Approach to Contracting under Imperfect Observations”. *SIAM Journal on Financial Mathematics* 3 (1), pp. 605-638, 2012. (with J. Cvitanić and T. Yolcu)
- “Stochastic Filtering for Diffusion Processes with Level Crossings”. *IEEE Transactions on Automatic Control* 56, pp. 2201-2206, 2011. (with I. Fatkullin and L. Shi)
- “A Convex Optimization Approach to Filtering in Jump Systems with State Dependent Transition Probabilities”. *Automatica* 46, pp. 383-389, 2010.
- “Credit Risk Modeling with Misreporting and Incomplete Information”. *International Journal of Theoretical and Applied Finance* 12, pp. 81-112, 2009. (with J. Cvitanić)
- “A New Algorithm for On-line Coloring Bipartite Graphs”. *SIAM Journal of Discrete Mathematics* 22, pp. 72-91, 2008. (with H. Broersma and D. Paulusma)

Conditionally Accepted Papers

- “Credit Portfolio with Self-Exciting Defaults”. *Mathematical Finance*. Accepted under major revisions. (with L. Bo)
- “Optimal Clearinghouse Collateral Requirements”. *Operations Research*. Revise and resubmit. (with W.A. Cheng)

Submitted Papers

- “Bail-ins and Bail-outs: Incentives, Connectivity, and Systemic Stability”. *Submitted*. (with B. Bernard and J. Stiglitz)
- “Clearinghouse Default Waterfall: Risk Sharing, Incentives, and Systemic Risk”. *Submitted*. (with J. Sethuraman and W.A. Cheng)
- “Intraday Market Making with Overnight Inventory Costs”. *Submitted*. (with T. Adrian, E. Vogt and H. Zhang)

Working Papers

- “Endogenous Formation of Interbank Networks”. (with B. Bernard and J. Stiglitz)
- “Equilibrium Wealth Dynamics in Collateralized Markets”. (with W.A. Cheng and S. Rajan)
- “Over-the-Counter Markets with Counterparty Risk”. (with C. Brunetti and C. Frei)
- “Designing Clearinghouse Default Funds: the Role of Risk Taking Incentives”. (with J. Wang and H. Zhang)
- “Clearinghouse Margining and Systemic Risk: an empirical analysis”. (with W.A. Cheng, R. Haynes, and S. Giglio)
- “Systemic Risk and Liquidity Provision”. (with D.D. Yao and X. Sun)
- “Multi-period Dynamic Oligopoly”. (with H. Alsbah, B. Bernard, G. Iyengar, and J. Sethuraman)

Book Chapters, Practitioner and Policy Papers

- “Systemic Risk, Policy, and Data Needs”. *Informs Tutorials in Operations Research*, Forthcoming. Published Online, November 4, 2016
- “Capital and Resolution Policies: the US Interbank Market”. *Journal of Financial Stability*, Forthcoming. Published online, May 6, 2016 (with J. Dooley, M. Oet, and S. Ong)
- “Measuring Counterparty Risk of Large Portfolios”. *CreditFlux* Magazine, April 2014.
- “Pricing and Mitigation of Counterparty Credit Exposures”. *Handbook of Systemic Risk*, Edited by J.-P. Fouque and J. Langsam, Cambridge University Press, pp. 1-21, 2012.
- “Liquidity Modeling for Credit Default Swaps: an overview”. *Credit Risk Frontiers. The supprime crisis, Pricing and Hedging, CVA, MBS, Ratings and Liquidity*. Bloomberg Press, pp. 1-36, 2011. (with D. Brigo and M. Pedrescu)
- “Bilateral Credit Valuation Adjustment with Application to Credit Default Swaps”. *In Ong, Michael ed., Managing and Measuring Capital*. London: Risk Books, pp.47-67, 2012. (with D. Brigo)
- Bilateral Counterparty Risk with Application to CDSs. *Risk Magazine*, pp. 85-90, 2010. (with D. Brigo)

Professional Service

- **SIAM Activity Group on Financial Mathematics and Engineering:** Director (December 2016-Present).
- **Central Clearing Interdependencies:** Member of the roundtable on central clearing interdependencies, a study group established by the Basel Committee on Banking Supervision (BCBS), the Committee on Payments and Market Infrastructures (CPMI), the Financial Stability Board (FSB), and the International Organization of Securities Commissions (IOSCO). (December 2015)
- **Informa Society:** Board Member, Applied Probability (December 2015-Present).
- **Informa Society:** Chair of the Cluster on Finance (Informa, 2017).
- **Informa Society:** Tutorials Co-chair (joint with A. Gupta) (Informa 2016).
- **Informa Society:** Chair of the Cluster on Risk Management (Informa, 2015).
- **IEEE Computational Intelligence Society:** Member of the technical committee for Computational Finance and Economics. (2009-Present)

Ad-hoc Reviewer

- *Management Science, Operations Research, Mathematics of Operations Research, Mathematical Finance, Finance and Stochastics, Annals of Applied Probability, SIAM Journal of Financial Mathematics, SIAM Journal on Control and Optimization, Journal of Banking and Finance, Journal of Economic Dynamics and Control, Stochastic Systems, Applied Mathematics and Optimization, IEEE Transactions on Automatic Control, Automatica, Quantitative Finance, Mathematical and Financial Economics, Journal of Banking and Finance, International Journal of Theoretical and Applied Finance, Journal of Computational Finance, Journal of Credit Risk, Statistics and Risk Modeling, Journal of Financial Stability, Risk, Springer-Verlag, World Scientific Publishing Co.*

Editorial Board

- **Associate Editor.** *Mathematical Finance*, January 2017-present.
- **Associate Editor.** *Operations Research Letters*, 2012-present.
- **Department Editor.** *Institute of Industrial Engineering Transactions, Department of Financial Engineering*, 2015-present.
- **Associate Editor (Ad Hoc).** *Management Science*, January 2017-present.

Conference Organization

- **2017.** Informa Annual meeting (session organizer), Informa 19th Applied probability conference (session organizer)
- **2016.** Co-Organizer of the 1st Eastern Financial Mathematics Conference, Informa Annual Meeting (session organizer and panel organizer), SIAM Conference on Financial Mathematics and Engineering (mini-symposium organizer)
- **2015.** IMS-FIPS Workshop (session organizer), Symposium on Systemic Risk at Columbia University (co-organizer).
- **2014.** SIAM Conference on Financial Mathematics and Engineering (mini-symposium organizer), Informa Annual meeting (session organizer), American Mathematical Society 2014: Spring Eastern Sectional Meeting (session organizer).

- **2013.** Informs Annual meeting (session organizer).
- **2012.** Informs Annual meeting (session organizer).
- **2011.** Informs Annual meeting (session organizer).

INVITED TALKS

Invited Talks

- **2017.** Oxford University (seminar at Institute for New Economic Thinking at the Oxford Martin School, and seminar at Mathematical and Computational Finance seminar); Massachusetts Institute of Technology, LIDS Center; Cambridge University (Judge Business School); London School of Economics (Risk and Stochastics and Financial Mathematics Seminar); Minisymposium on limit order book and high frequency trading (University of Pittsburgh); Brown-Bag Seminar at Decisions Risk and Operations (Columbia University); Centre de recherches mathématiques (CRM) of Montreal (Risk Measurement and Regulatory Issues in Business workshop); Centre de Recherches Mathématiques in Montreal (Workshop on Systemic Risk); The Campbell-Lo-MacKinlay conference on the Econometrics of Financial Markets; Informs Applied Probability Meeting (Kellogg School of Management); University of Chicago, Stevanovich Center for Financial Mathematics (Market Microstructure and High-Frequency Data annual conference);
- **2016.** Financial Engineering Practitioners Seminar (Columbia University); Ecole Polytechnique Paris, Center of Applied Mathematics; Frontiers in Stochastic Modeling for Finance; IBM T.J. Watson Research Center (Mathematical Sciences); Second International Congress on Actuarial Science and Quantitative Finance, Cartagena (Colombia); Berkeley-Columbia Meeting in Engineering and Statistics (UC Berkeley); University of Illinois at Urbana Champaign (Mathematical Finance, Risk and Uncertainty Seminar); ETH Zurich (Insurance Mathematics and Stochastic Finance); Risk measures, Capital allocation and Central counterparties workshop (Standard Chartered offices in Singapore); Canadian Operational Research Society Annual Conference (Banff); Vienna Congress on Mathematical Finance; Informs Annual Meeting (invited tutorial and session speaker); IMS-FIPS Workshop; GRI-Fields Conference and Workshop on the Stability of Financial Systems: Modelling, Regulation and Stress Testing; Second Bar-Ilan Conference on Financial Mathematics (Tel Aviv); 9-th World Congress of the Bachelier Finance Society; Quant Summit USA 2016; University of Michigan (Financial/Actuarial Mathematics); SIAM Conference on Financial Mathematics and Engineering 2016; American Mathematical Society 2014: Fall Eastern Sectional Meeting in Brunswick, ME; Global Risk Institute Summit 2016: Risk and Reward; Fields Institute's Quantitative Finance Seminar Series 2016.
- **2015.** Systemic Risk in Financial Markets Workshop (Hannover); VU University Amsterdam; 2015 Financial Stability Conference: Policy Analysis and Data Needs; The Consortium for Systemic Risk Analytics (Massachusetts Institute of Technology); New York University; Global Risk Institute (Toronto); Data, Algorithms and Problems on Graphs Workshop (Columbia University); CUNY Probability Seminar; Informs Annual meeting; Thalesian Seminar (New York University); 7th General AMaMeF and Swissquote Conference (École Polytechnique Fédérale de Lausanne); IBM T.J. Watson Research Center (Electrical Engineering); IMS-FIPS Workshop (Rutgers University); University of Maryland; April 16th INET Seminar (Columbia University); Cornell University; Stevens Institute of Technology; Carnegie Mellon University (Math Department); Carnegie Mellon University (Tepper School of Business); Columbia University (Math Finance Seminar); Morgan

Stanley; IPAM Institute (University of California Los Angeles); California Institute of Technology; Stanford University; Princeton University; US Commodity Futures Trading Commission; Office of the Comptroller of Currency.

- **2014.** 2014 Financial Stability Conference; SIAM Conference on Financial Mathematics & Engineering, Chicago; TU Berlin and Humboldt University; Informs Annual meeting; Isaac Newton Institute for Mathematical Sciences (Cambridge University); Conference on Credit and Systemic Risk (Boston University); Columbia University; Worcester Polytechnic Institute; Workshop on New Directions in Financial Mathematics and Mathematical Economics (Banff International Research Station); Joint Mathematics Meetings, Imperial College London (Stochastic Analysis Seminars and Finance and Stochastic Seminars); London School of Economics.
- **2013.** Conference on Mathematical Finance and Partial Differential Equations (Rutgers University); Texas Quantitative Finance Festival (University of Texas, Austin); AMS 2013 Fall Eastern Sectional Meeting (Temple University); Informs Annual meeting; Federal Bank of Cleveland; Dublin City University; Frontiers in Financial Mathematics Conference; 2013 Financial Stability Analysis Conference: Using the Tools, Finding the Data; Purdue University (Computational Finance Seminar); University of Wisconsin-Milwaukee; Illinois Institute of Technology; Johns Hopkins University.
- **2012.** Carnegie Mellon University; Informs Annual meeting; Quant Congress USA; SIAM Annual Meeting Financial Mathematics, Minneapolis; IMS on Finance: Probability and Statistics (University of California, Berkeley); Marcus Evans CVA Funding and Valuation for Derivatives Conference (New York); Columbia University (Math Finance Seminar).
- **2011.** Illinois Institute of Technology; Informs Annual meeting; 7th International Congress on Industrial and Applied Mathematics (ICIAM 2011); École Polytechnique Fédérale de Lausanne, Swiss Institute of Finance; AMS 2011 Central Section Meeting (University of Iowa); Purdue University (Computational Finance seminar); Cornell University;
- **2010.** Informs Annual meeting; SIAM Conference on Financial Mathematics and Engineering, San Francisco; Derivatives, Volatility & Correlation (Warwick Business School); Fields Institute for Research in Mathematical Science.
- **2009.** Informs Annual meeting; Purdue University; Lehigh University; Auctions, Market Mechanisms and Their Applications (First International ICST Conference), Boston; IEEE International Conference on Computational Intelligence for Financial Engineering (invited tutorial, video available at http://ewh.ieee.org/cmte/cis/mtsc/ieeecis/video_tutorials.htm).

TEACHING

Columbia

Graduate

- **IEOR E8100: Networks: Games, Contagion and Control**, New graduate level course developed, IEOR Department, Columbia University. *Spring 2017, Midterm Course Evaluation: 4.64/5.0, Midterm Instructor Evaluation: 4.73/5.0, Number of enrolled students: 22.*

- **IEOR E4707: Continuous Time Asset Pricing**, Instructor, IEOR Department, Columbia University, Spring 2015, Spring 2016. *Spring 2015 Course Evaluation: 4.3/5.0, Instructor Evaluation: 4.34/5.0, Number of enrolled students: 91. Spring 2016 Course Evaluation: 4.62/5.0, Instructor Evaluation: 4.53/5.0, Number of enrolled students: 90.*
- **IEOR E4731: Credit Risk/Credit Derivative**, Instructor, IEOR Department, Columbia University, Summer 2015, Summer 2016. *Summer 2015 Course Evaluation: 4.08/5.0, Instructor Evaluation: 4.23/5.0, Number of enrolled students: 15. Summer 2016 Course Evaluation: 4.71/5.0, Instructor Evaluation: 4.71/5.0, Number of enrolled students: 7.*

Other institutions

Undergraduate

- **IE 343: Engineering Economics**, Instructor, Department of Industrial Engineering, Purdue University, Fall 2010, Spring 2011, and Fall 2013. *Fall 2010 Course Evaluation: 4.0/5.0, Instructor Evaluation: 4.1/5.0, Number of enrolled students: 270. Spring 2011 Course Evaluation: 4.1/5.0, Instructor Evaluation: 4.1/5.0, Number of enrolled students: 125. Fall 2012 Course Evaluation: 4.0/5.0, Instructor Evaluation: 4.0/5.0, Number of enrolled students: 275.*

Graduate

- **EN.550.428: Stochastic Processes and Applications to Finance II**, Instructor, Department of Applied Mathematics and Statistics, Johns Hopkins University. *Spring 2014 Course evaluation: 4.55/5.0, Instructor Evaluation: 4.52/5.0, Number of enrolled students: 30.*
- **EN 550.648: Credit and Systemic Risk**, Instructor, Department of Applied Mathematics and Statistics, Johns Hopkins University. *Fall 2013 Course Evaluation: 4.6/5.0, Instructor Evaluation: 4.57/5.0, Number of enrolled students: 20.*
- **IE 590: Credit Risk**, Instructor, Department of Industrial Engineering, Purdue University. *Spring Semester 2013 Course Evaluation: 4.9/5.0, Instructor Evaluation: 4.9/5.0, Number of enrolled students: 15.*
- **ISE 563: Financial Engineering**, Instructor, Department of Industrial and Systems Engineering, University of Southern California. *Summer 2009, Number of enrolled students: 23.*

STUDENTS MENTORING

Dissertation Defense Committee Member for

- Yuan Kay, DRO, Columbia University, Ph.D, April 2017
- Jing Guo, IEOR, Columbia University, Ph.D, March 2017
- Richard Neuberg, Department of Statistics, Columbia University, Ph.D, October 2016
- Zheng Wang, IEOR, Columbia University, Ph.D, October 2016
- Juan Li, IEOR, Columbia University, Ph.D, May 2015
- Marco Santoli, IEOR, Columbia University, Ph.D, April 2015
- Jeff Nisen, Department of Statistics, Purdue University, Ph.D, June 2013

- Stefano Pagliarani, Department of Mathematics, University of Padua, Ph.D, October 2013

Students Supervision

- Allen Cheng, IEOR Department, Columbia University. Ph.D. Topic: Clearing-houses, Risk Sharing, and Collateral Requirements. Expected graduation date: June/December, 2017.
- Humoud Alsabah, , IEOR Department, Columbia University. Ph.D. Topic: Commodities. Expected graduation date: June/December, 2020.
- Peng-Chu Chen, Department of Industrial Engineering, Purdue University. Ph.D. Topic: Systemic risk in financial networks. Graduation date: July 2016. First job: Assistant Professor, The University of Hong Kong, Department of Industrial and Manufacturing Systems Engineering.

Postdoc/Research Associate Mentoring

- Matthew Stern, IEOR Department, Columbia University. Topics: Human Machine Interaction Games. Post-doc. February 2017-December, 2017.
- Marko Weber, IEOR Department, Columbia University. Topics: Balance Sheet Optimization, XVA, and Automated Trading. Post-doc. March 2017-March 2018.
- Benjamin Bernard, IEOR Department, Columbia University. Topics: Game theoretical models for commodity and networks. Post-doc. February 2016-June 2017.
- Hongzhong Zhang, IEOR Department, Columbia University. Topics: High Frequency Trading and Clearinghouses. Research Associate. May 2016-December 2017.

PROFESSIONAL MEMBERSHIPS

Member of the Econometric Society, International Association for Quantitative Finance, Informs Society, SIAM Society, and Bachelier Society.

INDUSTRIAL EXPERIENCE

Signal processing engineer and Marie Curie fellow (Thales Naval Netherlands, Feb. 2003- July 2004), Spring Associate credit trading strategist (JP-Morgan, March-June 2008), Summer Associate (Citigroup, July-September 2008), Summer Associate (Ellington Management Group, July-September 2006 and June-August 2007).