

# Agostino Capponi

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CONTACT INFORMATION	<i>Associate Professor (with tenure)</i> Department of Industrial Engineering and Operations Research <b>Columbia University</b> 535G S. W. Mudd Building New York NY 10027, USA	<i>Voice:</i> +1(212) 854-4334 <i>Email:</i> <a href="mailto:ac3827@columbia.edu">ac3827@columbia.edu</a> <a href="http://www.columbia.edu/~ac3827">http://www.columbia.edu/~ac3827</a>
EDUCATION	<b>California Institute of Technology</b> , Department of Computing & Mathematical Sciences, Pasadena, California, USA Ph.D. in Computer Science, June 2009 <ul style="list-style-type: none"><li>Title: <i>Credit Risk and Non-linear Filtering: Computational Aspects and Empirical Evidence</i></li><li>Ph.D. Advisor: Professor Jakša Cvitanić</li><li>Minor in Applied &amp; Computational Mathematics, GPA 4.0/4.0, March 2007</li></ul> M.S., GPA 4.0/4.0, June 2006 <b>University of Rome “La Sapienza”</b> , Department of Information Sciences, Rome, Italy B.S., <i>Magna cum Laude</i> , December 2001	
PROFESSIONAL EXPERIENCE	<i>Associate Professor (with tenure)</i> Industrial Engineering and Operations Research Department <b>Columbia University</b> , New York, NY. <i>Tenure-Track Assistant Professor</i> Industrial Engineering and Operations Research Department <b>Columbia University</b> , New York, NY. <i>Consultant</i> Office of the Chief Economist <b>U.S. Commodity Futures Trading Commission</b> , Washington D.C. <i>Visiting Scholar</i> <b>Federal Reserve Board of Governors</b> , Washington D.C. <i>Tenure-Track Assistant Professor</i> Department of Applied Mathematics and Statistics <b>Johns Hopkins University</b> , Baltimore, MD. <i>Tenure-Track Assistant Professor</i> Department of Industrial Engineering <b>Purdue University</b> , West Lafayette, IN. <i>Visiting Assistant Professor</i> Swiss Institute of Finance <b>École Polytechnique Fédérale de Lausanne</b> , Lausanne, Switzerland. <i>Full-Time Associate, Derivatives Analysis</i> <b>Goldman Sachs International</b> , London, U.K. <i>Instructor</i> Department of Industrial and Systems Engineering <b>University of Southern California</b> , Los Angeles, California.	Oct. 2018 – present Aug. 2014 – Oct. 2018 Feb. 2016 – present March. 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

### Awards

- **JP Morgan AI Faculty Research Award.** Robo-Advising as a Symbiotic Human-Machine System, 2019-2020 (\$1500,000).
- **NSF CAREER-1752326.** Systemic Risk and Strategic Formation in Stochastic Networks, 2018-2023 (\$500,000).
- **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).
- **Best student Paper Award.** IEEE International Conference on Computational Intelligence for Financial Engineering (CIFEr'09).

### Grants

- **Clearpool Group.** Sole PI. Market Impact Modelling on Active/Aggressive Trading and Passive Limit Order Placement, 2018-2019 (\$149,241).
- **NSF DMS-1716145.** Sole PI. Mathematics and Control of Systemic and High-Frequency Trading Risks, 2017-2020 (\$225,189).
- **DARPA.** Sole PI. A Mathematical Framework for Complex Human-Machine Interaction Systems, 2016-2017 (\$175,000).
- **Global Risk Institute.** Sole PI. Centralized Trading: Collateral, Risk Shifting, and Competition, 2016-2018. (\$119,934).
- **OCP Group.** CO-PI (joint with G. Iyengar and J. Sethuraman), 2015-2016 (\$285,269).
- **Institute for New Economic Thinking.** Sole PI. Dynamic Contagion Mechanisms in Financial Networks, 2013-2014. (\$75,000). Acceptance rate: 8%.
- **IFM Grant.** Institute for Financial Markets, 2012. Selected among the top five by the Advisory Committee of the Clearing Corporation Foundation (\$15,000).
- **Marie Curie Fellowship.** European Commission, 2003-2004 (€48,000).

### Patents

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

PUBLICATIONS

### Refereed Journal Publications

- "Swing Pricing for Mutual Funds : Breaking the Feedback Loop Between Fire Sales and Fund Runs". *Management Science*. Forthcoming (with P. Glasserman and M. Weber)
- "Portfolio Choice with Market-Credit Risk Dependencies". *SIAM Journal on Control and Optimization* 56(4), 3050-3091, 2018. (with L. Bo)
- "Clearinghouse Collateral Requirements". *Operations Research* 66(6), 1542-1558, 2018. (with W.A. Cheng)

- “Credit Portfolio with Decaying Contagion Intensities”. *Mathematical Finance* 29(1), 137-173, 2019. (with L. Bo and P.C. Chen)
- “Risk Sensitive Asset Management and Cascading Defaults”. *Mathematics of Operations Research* (**Featured Article**) 43(1), 1-28, 2018. (with J. Birge and L. Bo). Media Coverage: Chicago Booth Review
- “Optimal Investment under Information Driven Contagious Distress”. *SIAM Journal on Control and Optimization* 55(2), pp. 1020-1068, 2017. (with L. Bo)
- “Arbitrage-Free XVA”. *Mathematical Finance* 28(2), pp. 582-620, 2018. (with M. Bichuch and S. Sturm)
- “Optimal Credit Investment with Borrowing Costs”. *Mathematics of Operations Research* 42(2), 546-575, 2017. (with L. Bo)
- “Dynamic Investment and Counterparty Risk”. *Applied Mathematics and Optimization* 77(1), 1-45, 2018. (with L. Bo)
- “Systemic Influences on Optimal Equity-Credit Investment”. *Management Science* 63(8), 2756-2771, 2017. (with C. Frei)
- “Robust Optimization of Credit Portfolios”. *Mathematics of Operations Research* 42(1), pp. 30-56, 2017. (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* (**Featured Article**), 6(1), pp. 386-424, 2015 (with L. Bo)  
**Winner of the 2016 Bar Ilan General Prize for papers in Financial Mathematics**
- “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.
- “Resource Optimisation in a Wireless Sensor Network with Guaranteed Estimator Performance”. *IET Control Theory and Applications* 4, pp. 710-723, 2010. (with K. Johansson, R. Murray, and L. Shi)
- “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)
- “A Mean Track Approach Applied to the Multidimensional Assignment Problem”. *IEEE Transactions on Aerospace and Electronic Systems* 43, pp. 450-471, 2007. (with H. De Waard)
- “Accuracy of Fused Track for Radar Systems”. *Signal Processing* 85, pp. 1189-1210, 2005. (with A. Di Lallo, A. Farina, and T. Volpi)
- “A Polynomial Time Algorithm for Data Association Problem in Multitarget Tracking”. *IEEE Transactions on Aerospace and Electronic Systems* 40, pp. 1398-1410, 2004.

#### Conditionally Accepted Papers

- “Bail-ins and Bail-outs: Incentives, Connectivity, and Systemic Stability”. Media Coverage: VoX. *Journal of Political Economy*. Revise and Resubmit. (with B. Bernard and J. Stiglitz)
- “Counterparty Risk and Network Formation in Over-the-Counter Markets”. *Journal of Financial Economics*. Revise and Resubmit. (with C. Frei)
- “Enterprise Value Dynamics in Centrally Cleared Markets”. Media Coverage: Bloomberg, Thomson Reuter, American Banker. *Mathematical Finance*. Revise and Resubmit. (with W.A. Cheng and S. Rajan)

- “A Dynamic Network Model of Interbank Lending: Systemic Risk and Liquidity Provisioning”. *Mathematics of Operations Research*. Revise and Resubmit. (with D.D. Yao and X. Sun)  
**Finalist of the 2017 INFORMS Finance Services Student best paper competition**
- “Robust XVA”. *Mathematical Finance*. Revise and Resubmit. (with M. Bichuch and S. Sturm)
- “Robo-Advising as a Human-Machine Interaction System”. *Journal of Financial Econometrics*. Revise and Resubmit. (with O.R. Lacedelli and M. Stern)

### Submitted Papers

- “Managing Counterparty Risk in Over-the-Counter Markets”. (with C. Brunetti and C. Frei)
- “Intraday Market Making with Overnight Inventory Costs”. (with T. Adrian, E. Vogt and H. Zhang)
- “Forward Investment Performance Processes in Semimartingale Financial Markets”. (with L. Bo and C. Zhou)
- “Multiregional Oligopoly with Capacity Constraints”. (with H. Alsabah, B. Bernard, G. Iyengar, and J. Sethuraman)
- “Large Orders in Small Markets: On Optimal Execution with Endogenous Liquidity Supply”. (with A. Menkveld and H. Zhang)
- “Pitfalls of Bitcoin’s Proof-of-Work Protocol: Mining Arms Race and Tendency Towards Centralization”. (with H. Alsabah)  
**Winner of the best Doctoral Paper Award at the Second Toronto Fintech Conference.**
- “Systemic Portfolio Diversification”. (with M. Weber)

### Working Papers

- “Clearinghouse Default Waterfall: Risk Sharing, Incentives, and Systemic Risk”. (with J. Sethuraman and W.A. Cheng)  
**Winner of the 2017 INFORMS Finance Services Student best paper award**
- “Central Clearing and the Sizing of Default Funds”. (with J. Wang and H. Zhang)
- “The Collateral Rule: an Empirical Analysis of the CDS Market”. (with W.A. Cheng, R. Haynes, and S. Giglio)
- “Central Bank Digital Currency: The Privacy-Efficiency Tradeoff”. (with C. Frei)
- “Bank Specific and Network Externalities in Over-the-Counter Markets” (with C. Frei)
- “Systemic Risk Portfolio Selection”. (with A. La Plante and A. Rubtsov)

### Book Chapters, Practitioner and Policy Papers

- “Systemic Risk, Policy, and Data Needs”. *INFORMS Tutorials in Operations Research*, 185-206, 2016

- “Capital and Resolution Policies: the US Interbank Market”. *Journal of Financial Stability*, 30, pp. 229-239, 2017 (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.
- “Systemic Risk: Clustering and Contagion Mechanisms. *Review of Futures Markets* 21 Special Edition, 57-70, 2011 (with P.C. Chen)
- “Liquidity Modeling for Credit Default Swaps: an Overview”. *Credit Risk Frontiers. The supreme 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 ACTIVITIES

### Professional Service

- **INFORMS Society:** President of the INFORMS Finance Section (2019-2021).
- **SIAM Activity Group on Financial Mathematics and Engineering:** Co-Chair of the Biennial SIAM-FME Meeting (June 2019).
- **INFORMS Society:** Chair of the Cluster on Financial Services (INFORMS 2019).
- **INFORMS Society:** Chair of the Cluster on Financial Services (INFORMS 2018).
- **SIAM Activity Group on Financial Mathematics and Engineering:** Director (December 2016-Present).
- **INFORMS Society:** Chair of the Cluster on Financial Services (INFORMS 2017).
- **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, and September 2017)
- **INFORMS Society:** Board Member, Applied Probability (December 2015-Present).
- **INFORMS Society:** Tutorials Co-chair (joint with A. Gupta) (INFORMS 2016).
- **INFORMS Society:** Chair of the Cluster on Risk Management (INFORMS 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, Journal of Finance, 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, Advances in Applied Probability, Applied Mathematics and Optimization, IEEE Transactions on Automatic Control, IEEE Transactions on Signal Processing, IET Control Theory and Applications, Automatica, Quantitative Finance, Mathematical and Financial Economics, Journal of Corporate Finance, 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

- **Department Co-Editor.** *Management Science, Finance Department*, 2019-present.
- **Department Editor.** *Institute of Industrial Engineering Transactions, Department of Financial Engineering*, 2015-present.
- **Associate Editor.** *Stochastic Models*, March 2019-present.
- **Associate Editor.** *Journal of Dynamics & Games (American Institute of Mathematical Sciences)*, January 2019-present.
- **Associate Editor.** *Mathematics and Financial Economics*, January 2019-present.
- **Associate Editor.** *SIAM Journal on Financial Mathematics*, January 2019-present.
- **Associate Editor.** *Stochastic Systems*, October 2018-present.
- **Associate Editor.** *Management Science*, June 2018-present.
- **Associate Editor.** *Operations Research*, April 2018-present.
- **Associate Editor.** *Mathematical Finance*, January 2017-present.
- **Associate Editor.** *Applied Mathematical Finance*, February 2017-present.
- **Associate Editor.** *Operations Research Letters*, 2012-present.

### Conference Organization

- **2018.** Co-Organizer of the “Columbia & NYU Courant Math Finance Alumni Networking Event on Quantitative Portfolio Management” (joint with P. Kolm, K. Letang, and J. Cerniglia)
- **2018.** Co-Organizer of the Conference “New Ideas and Cutting-Edge Developments in FinTech (joint with P. Carr, P. Kolm, and A. Papanicolau)
- **2018.** Co-Organizer of the Berkeley–Columbia Meeting in Engineering and Statistics (joint with X. Guo, M. Nutz, and Y. Zhang)
- **2018.** Co-Organizer of the Conference “Financial Networks: Big Risks, Macroeconomic Externalities, and Policy Commitment Devices” (joint with J. Stiglitz).
- **2018.** SIAM Annual Meeting (mini-symposium chair).
- **2017.** Co-Organizer of the 2nd Eastern Financial Mathematics Conference (joint with P. Carr, P. Kolm, and A. Papanicolau), INFORMS Annual meeting (session chair), INFORMS 19th Applied probability conference (session chair)

- **2016.** Co-Organizer of the 1st Eastern Financial Mathematics Conference (joint with A. Minca, R. Sircar, and S. Sturm), INFORMS Annual Meeting (session chair and panel chair), SIAM Conference on Financial Mathematics and Engineering (mini-symposium chair)
- **2015.** IMS-FIPS Workshop (session chair), Symposium on Systemic Risk at Columbia University (co-organizer).
- **2014.** SIAM Conference on Financial Mathematics and Engineering (mini-symposium chair), INFORMS Annual meeting (session chair), American Mathematical Society 2014: Spring Eastern Sectional Meeting (session chair).
- **2013.** INFORMS Annual meeting (session chair).
- **2012.** INFORMS Annual meeting (session chair).
- **2011.** INFORMS Annual meeting (session chair).

#### Technical Committee Membership

- **2019.** Program committee member, Federal Reserve Board Conference on the Interconnectedness of Financial Systems.
- **2017, 2019.** Program committee member, INFORMS Applied Probability Society Conference.
- **2006-2010, Annually.** Program committee member, *IEEE International Conference on Information Fusion*.

#### Award Committee Membership

- **2017, 2018.** INFORMS Finance Student Paper Competition.

#### Grant Proposal Review

- National Science Foundation panelist. CMMI Operations Engineering. Peer review panel.
- National Science Foundation panelist. Economics. Ad hoc reviewer.

#### INVITED TALKS AND DISCUSSIONS

#### Invited Talks

- **2019.** University of Illinois at Urbana Champaign (Industrial & Enterprise Systems Engineering); UC Louvain (Finance Seminar); Georgia State University (Robinson College of Business); Washington University in Saint Louis; SIAM Conference on Financial Mathematics and Engineering 2019; Waterloo Conference in Statistics, Actuarial Science and Finance; Fields Institute Workshop; Workshop on equilibrium theory (Rutgers University); Federal Reserve Board Conference on the interconnectedness of financial systems (discussant); International Conference on Blockchain Economics, Security and Protocols 2019 (Tokenomics, Paris); Conference on Fintech and Machine Learning (National University of Singapore); 2019 INFORMS Annual Meeting; CEBRA 2019 Annual Meeting, Session on Digital Currency Economics and Policy (School of International and Public Affairs (SIPA), Columbia University);

- **2018.** Humboldt University; University of California Berkeley; Carnegie Mellon University; University of Pittsburgh; Florida State University; Purdue University; University of Connecticut; University of California Santa Barbara; Faculty Lunch Seminar, NYU Tandon School of Engineering; SIAM Annual Meeting; A Symposium on Optimal Stopping in memory of Larry Shepp (**plenary talk**); Financial Engineering and Risk Management International Symposium 2018; Center for Financial Studies Workshop 2018 “Artificial Intelligence & Machine Learning in Financial Services” (**semi-plenary talk**); GRI-Fields Institute Seminar; INFORMS Annual Meeting; Financial Intermediation Research Society conference; Fourth Annual Conference on Network Science and Economics; Columbia Financial Engineering Practitioners seminar; XVA Training Course (Risk Magazine); Board of Governors of the Federal Reserve System Finance Forum; 2018 Market Microstructure Confronting Many Viewpoints Conference; 3rd Eastern Conference in Mathematical Finance; Security Exchange Commission; Department of Treasury’s Office of Financial Research; Bank of England Conference on Non-bank Financial Institutions and Financial Stability;
- **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); Stanford University (Management Science and Engineering); Eighteenth World Congress of Economics (plenary session); 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 Measurement and Control of 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); INFORMS Annual Meeting; Third Annual conference on Network Science and Economics; New York University, Economics Department; The Hong Kong Polytechnique University; The Chinese University of Hong Kong; IMS-FIPS Workshop; Indiana University, Economics Department; 17th Federal Deposit Insurance Corporation-JFSR Fall Bank Research Conference; Ten Years After the Financial Crisis Conference at Columbia University;
- **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 2016: 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, discussant); Fields Institute for Research in Mathematical Science.
- **2009.** INFORMS Annual meeting; Purdue University; Lehigh University; Auctions, Market Mechanisms and Their Applications (First International ICST Con-

ference), Boston; IEEE International Conference on Computational Intelligence for Financial Engineering (invited tutorial, video available at [http://ewh.ieee.org/cmtc/cis/mtsc/ieeecis/video\\_tutorials.htm](http://ewh.ieee.org/cmtc/cis/mtsc/ieeecis/video_tutorials.htm) ).

### Invited discussions

- **2019.** March, 7. Discussion of paper: Collateralized Debt Networks with Lender Default, Author: Jin-Wook Chang FED Conference on the Interconnectedness of Financial Systems
- **2017.** November 3. Discussion of the Paper “Expected Stock Returns and the Correlation Risk Premium”, Author: Lorenzo Shoenleber. 2nd Eastern Conference in Mathematical Finance
- **2016.** October 28. Discussion leader, jointly with P. Glasserman of the Panel “The Future of Systemic Risk Measurement and Regulation”. Workshop on Systemic Risk in Insurance, Columbia University, New York.
- **2015.** April 16. Discussion of the paper: The price of Complexity in Financial Networks, Authors: S. Battiston, G. Caldarelli, R. May, T. Roukni, and J. Stiglitz. April 16th Institute of New Economic Thinking Seminar, Columbia University, New York

### MEDIA AND OUTREACH EFFORTS

#### Media

- VoX: Bail-ins and bailouts: Incentives, Connectivity, and Systemic Stability. October 18, 2017.
- Chicago Booth Review: Why Investors should buy more of that risky stock. November 30, 2016. Reporter: Erik Kobayashi-Solomon.
- Bloomberg Government: Systemic-Risk Fee urged for Clearinghouses by U.S. Researchers. May 7, 2015, 11:00am. Reporter: Silla Brush at [sbrush@bloomberg.net](mailto:sbrush@bloomberg.net).
- Bloomberg: Financial Regulation Brief, May 15, 2015.
- Reuters: Clearing houses are big risk, top U.S. federal research says, May 15, 2015, 3:39pm
- American Banker: Central Clearing is Riskier than You May Think, OFR Papers say, May 7, 2015. Reporter: John Heltman
- American Banker: FSOC Details the Threats It Sees to the System. May 19, 2015. Reporter: John Heltman
- Politico Pro: Charge big Banks to curb risks at clearinghouses, researchers propose. May, 7, 2015, 11:09am. Reporter: Zachary Warmbrodt at [zwarmbrodt@politico.com](mailto:zwarmbrodt@politico.com)

#### Outreach Efforts

- Academic Mentor for the Ithaca Education Consulting Group (IECG), March 2017-present
- Lab Demo: ENG Summer Program, July 3, 2017 (Number of Students: 15, Grade: 9th-10th)

- Lab Demo: Intrepid Museum's GOALS for Girls, July 18, 2017 (Number of Students: 25, Grade: 8th-9th)
- Columbia University Visit: Inside Engineering, May 30, 2018 (Number of Students: 8, Bronx School for Science and Mathematics, Grade: 8th-9th)

## TEACHING

### Columbia

#### Graduate

- **IEOR E8100: Networks: Games, Contagion and Control**, New graduate level course developed, IEOR Department, Columbia University. Spring 2017, Spring 2018. *Spring 2017, Course Evaluation: 4.64/5.0, Instructor Evaluation: 4.64/5.0, Number of enrolled students: 20. Spring 2018, Course Evaluation: 5.0/5.0, Instructor Evaluation: 5.0/5.0, Number of enrolled students: 10*
- **IEOR E4709: Data Analysis for Financial Engineering**, Instructor, IEOR Department, Columbia University. Spring 2017, Spring 2018. *Spring 2017, Course Evaluation: 4.11/5.0, Instructor Evaluation: 4.11/5.0, Number of enrolled students: 81. Spring 2018, Course Evaluation: 4.47/5.0, Instructor Evaluation: 4.43/5.0, Number of enrolled students: 106.*
- **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, Fall 2017, Fall 2018. *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. Fall 2017 Course Evaluation: 4.68/5.0, Instructor Evaluation: 4.74/5.0, Number of enrolled students: 31. Fall 2018 Course Evaluation: 4.56/5.0, Instructor Evaluation: 4.61/5.0, Number of enrolled students: 33.*

#### 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.*

DEPARTMENTAL  
SERVICE

### Columbia University

- **Fall 2018.** Co-organizer of the Financial Engineering Practitioners Seminars (IEOR, Columbia University). Joint with E. Derman.
- **2015, 2016, 2017, 2019.** Faculty Search Committee (IEOR, Columbia University), PhD admissions committee (IEOR, Columbia University).
- **2015.** Selection Committee for Master in Financial Engineering (MSFE).

### Other institutions

- **2013-2014.** Communications Committee (Johns Hopkins University).
- **2010-2012.** Undergraduate Curriculum Committee (Purdue University), Graduate Admission Committee (Purdue University).

STUDENTS  
MENTORING

### Dissertation Defense Committee Member for

- Weijie Pang, Mathematics, Worcester Polytechnic Institute, April 2019
- Xu Sun, IEOR, Columbia University, Ph.D, March 2019
- Octavio Ruiz Lacedelli, IEOR, Columbia University, February 2019
- Marco Francischello, Mathematics, Imperial College London, February 2019
- Desmond Ng, Applied Mathematics Department, The University of Sydney, Ph.D, August 2018
- Di Xiao, IEOR, Columbia University, Ph.D, August 2017
- Yannick Armenti, Mathematics Department, Evry University, Ph.D, July 2017
- Brian Ward, IEOR, Columbia University, Ph.D, June 2017
- Yuan Kai, 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: Clearinghouses, Risk Sharing, and Collateral Requirements. Graduation date: September, 20, 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**

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

### **Visitors**

- Damien Ackerer, IEOR Department, Columbia University. June 2016-September 2016. Visiting from the Ecole Polytechnique Federal de Lausanne.
- Felix Correll IEOR Department, Columbia University. September 2018-December 2018. Visiting from the European Economic Institute, Florence.

### **Research Undergraduate Student (REU)**

- Thu Hai Pham, IEOR Department, Columbia University. Topics: Games of Strategic Banks' Liquidation. June 2018-September 2018.

### **E.N.G. SEAS's Outreach research program for high school students**

- Justin Peralta, IEOR Department, Columbia University. Topics: Numerical Implementation of Banks' Liquidation Strategies. July 2018-August 2018.
- Eleazar Neri, IEOR Department, Columbia University. Topics: Numerical Implementation of Banks' Liquidation Strategies. July 2018-August 2018.

PROFESSIONAL  
MEMBERSHIPS

Member of the Econometric Society, 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).