

**Fordham University FinTech Conference**

**Blockchain, Cryptocurrency, Machine Learning, Textual Analysis, Risk Management, and Regulation**

Friday, March 16, 2018

McNally Auditorium

140 West 62nd Street, New York, NY 10023

**CONFERENCE SCHEDULE**

11:30AM-12:00PM: Registration

**ACADEMIC PRESENTATIONS**

12.00PM-12.10PM: Welcome and Opening Remarks

Sris Chatterjee

Fordham University

12.10PM - 1.00PM: Luncheon

Keynote: [*The Future of Modeling and Machine Learning in FinTech*](https://drive.google.com/open?id=1-lBd04x6o5OB8GD900sjBROzAwQH3PIw)

Sanjiv Das, Santa Clara University

1.15 PM-2.45 PM Artificial Intelligence and Machine Learning

Session Chair: Ren-Raw Chen, Fordham University

*[The Roles of Alternative Data Sources, Big Data, and Machine Learning in the New Financial Landscapes.](https://drive.google.com/open?id=10eUAnsSXJP3_0-XEkqLHL6nrOYODDTq4)*

Julapa Jagtiani, Federal Reserve Bank of Philadelphia

*[Fintech and the Innovation Trilemma](https://drive.google.com/open?id=13b7w209_Vu81dqXqv4WtsNCiitP2tdmv)*

Yesha Yadav, Vanderbilt Law School

2.45PM-3.00PM *COFFEE BREAK*

3.00 PM-4.30 PM Blockchain and Cryptocurrency

Session Chair: Evangelos Katsamakas, Fordham University

*[The Law of One Bitcoin Price?](https://drive.google.com/open?id=1oLKdKSL9qQKbB7OY63kTaqLK3cFufPJW)*

Asani Sarkar, NY Fed

*[Blockchain Revolution without the Blockchain](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3133313)*

Hanna Halabudra, NYU & Bank of Canada

Related Reading: [*Bitcoin: A Revolution?*](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3133346)

*[How Much Fintech is in Your Bank? The Fintech Footprint in Bank Returns](https://drive.google.com/open?id=11H9q_7nChIbr0hgQuRL1BzZSNM_SEkNU)*

Yi Tang, Fordham University

**PANEL DISCUSSIONS**

5.00PM - 6.00PM Blockchain and The Future of Financial Services

Panel Moderator: N. K. Chidambaran, Fordham University

*Blockchain and the future of Financial Services*

Paul Johnson, Nicusa Investment Advisors & Fordham University

*Artificial Intelligence Solutions*

Kumesh Aroomoogan, Accern

*Challenges and Opportunities in Global Investment*

Mac Sykes, GAMCO Investors Inc.

6.15PM - 7.15PM Trading Systems and Risk Management

Panel Moderator: Robert Chiang, Fordham University

*The “What” and “Why” of FinTech Applications*

Michael Sternberg, RBC Capital Markets

*Challenges of Using Machine Learning in Financial Industry Operation*

Tyler Yang, IFE Group

**RECEPTION**

**7.30 PM – 8.30 PM**

**Platt Court, 140 West 62 Street, New York**

**PARTICIPANTS**

**Kumesh Aroomoogan** is the co-founder and chief executive officer of Accern, a data design startup that uses artificial intelligence to design predictive analytics solutions from more than one billion websites and premium financial news data feeds. Accern currently powers some of the world's largest quantitative hedge fund strategies and Fortune 500 companies applications with predictive news analytics. Aroomoogan was recently named to the 2018 Forbes 30 Under 30 list for running the only fintech company in the enterprise technology category.

**Sris Chatterjee** is a professor of finance at the Fordham University Gabelli School of Business. He has taught a variety of courses, including Mergers and Acquisitions, Principles of Modern Finance, Behavioral Finance, and Impact Investing at the undergraduate, graduate, and executive MBA levels. In 1995, he received Fordham's Gladys and Henry Crown Award for Faculty Excellence at the graduate school level. Sris got his undergraduate degree in mechanical engineering from the Indian Institute of Technology in Kharagpur and his postgraduate diploma in management from the Indian Institute of Management, Calcutta. He received his M.Phil. and Ph.D. from Columbia Business School. Before joining the Fordham faculty, Chatterjee taught at the State University of New York at Buffalo, Rutgers University, and Columbia University. He has taught in the Key Training Program at UBS Wealth Management, where he participated in curriculum development and in writing training material. His research has been published in the Journal of Banking and Finance, theJournal of Financial Economics, theFinancial Management, the Journal of Financial and Quantitative Analysis,and the Journal of Futures Markets. Chatterjee is an associate editor of the Journal of Financial Stability and the International Journal of Banking, Accounting and Finance. He also sits on the editorial board of the International Journal of Behavioural Accounting and Finance.

**Ren-Raw Chen** is a professor of finance at the Fordham University Gabelli School of Business. He specializes in modeling term structure of interest rates and credit risks, automating pricing models for trading desks and rating agencies, deriving closed-form solutions, implementing lattice and Monte Carlo simulations, and complex calibrations. Chen has published papers in major finance and professional journals. He has implemented pricing models for financial companies, including credit derivatives pricing models for Lehman Brothers, structural default models for Moody's KMV, convertible bond and fixed-income derivatives models for Grand Cathy Securities Corporation, and a two-factor HJM model for Polypaths Software. Chen received his Ph.D. in finance from the University of Illinois at Urbana-Champaign. He has taught at Rutgers University, the University of Pittsburgh, National Taiwan University, and Hong Kong University. He has worked at JPMorgan, Lehman Brothers, Grand Cathy Securities Corporation, Moody's KMV, BlackRock, and Morgan Stanley.

**Robert Chiang** is an associate professor of information systems at the Fordham University Gabelli School of Business. He received his doctoral degree in information systems from the University of Washington. Prior to joining the Gabelli School of Business faculty, he was an assistant professor at the University of Connecticut School of Business and a manager at Accenture. Chiang's research interests are in software process improvement, information-systems economics, and e-commerce design. His articles have appeared in leading journals such as Information System Research, Operations Research, Journal on Management Information Systems, IEEE Transactions, and INFORMS Journal on Computing. His consulting experience spans business process reengineering, project/program management, requirements management, organizational change enablement, and system development methodology improvement. His clients have included leading global and U.S. companies in the financial, health care, transportation, and energy industries.

**N. K. “Chiddi” Chidambaran** is an associate professor of finance at the Fordham University Gabelli School of Business. Previously he was a faculty member at Rutgers University and Tulane University. He received his Ph.D. from the NYU Stern School of Business and his bachelor’s degree from the Indian Institute of Technology, Bombay. Chidambaran’s research interests are in the field of corporate governance, risk management, and computational finance. He has published his research in leading academic journals such as the Journal of Financial Economics, and his work has also been presented at major research conferences and universities. His work has also been published in books, such as the Handbook of Quantitative Finance and Risk Management, and in conference proceedings. Chidambaran teaches financial market and corporate finance courses. He is the recipient of several teaching awards, most recently Fordham University’s Magis Award.

**Sanjiv Das** is the William and Janice Terry Professor of Finance at Santa Clara University's Leavey School of Business. He previously held faculty appointments as associate professor at Harvard Business School and UC Berkeley. He holds postgraduate degrees in finance (M.Phil. and Ph.D. from New York University), and computer science (M.S. from UC Berkeley), as well as an MBA (from the Indian Institute of Management, Ahmedabad). He earned a B.Com. in accounting and economics (University of Bombay, Sydenham College), and is also a qualified cost and works accountant. He is a senior editor of the The Journal of Investment Management, co-editor of The Journal of Derivatives, and associate editor of other academic journals. Prior to becoming an academic, he worked in the derivatives business in the Asia-Pacific region as a vice president at Citibank. Das’ current research interests include the modeling of default risk, machine learning, social networks, derivatives pricing models, portfolio theory, and venture capital. He has published more than 80 articles in academic journals, and has won numerous awards for research and teaching. His recent book, Derivatives: Principles and Practice, was published in May 2010. He currently also serves as a senior fellow at the FDIC Center for Financial Research.

[**Hanna Halaburda**](http://www.halaburda.ca/) is a visiting professor at the NYU Stern School of Business and a senior economist at the Bank of Canada. Before joining Stern, Halaburda was an assistant professor at the Harvard Business School. Her research uses game theory to study how technology influences network effects and interactions in the marketplace and how these changes affect business models. Much of her work focuses on competition between platforms, e.g., Apple’s iPhone vs. Android or eHarmony vs. Match. Most recently, her research applies platform competition concepts to analyze the development of digital currencies and blockchain technologies. Her work has been published in many journals, including American Economic Journal: Microeconomics Games, and Economic Behavior; Journal of Economics Management and Strategy; and Management Science. With her colleague Miklos Sarvary, she has also coauthored Beyond Bitcoin: The Economics of Digital Currency (Palgrave, 2016).

**Julapa Jagtiani** is senior special advisor at the Federal Reserve Bank of Philadelphia and a fellow at the Wharton Financial Institutions Center. Previously, Jagtiani was a senior economist at the Chicago Fed and Kansas City Fed. Before joining the Fed, she was associate professor of finance at Baruch College, CUNY. At the Federal Reserve, Jagtiani has participated in several supervisory policy projects, including serving on the Federal Reserve FinTech Task Force. She has published articles in top finance journals. Her recent research has focused on fintech lending and the roles of big data and ML in bank supervision. She also serves as a fintech subject matter expert at the Philly Fed. Outside the Fed, Julapa serves on the Leadership Council Board of Directors for the American Red Cross. She was a Rockefeller Foundation Fellowship recipient, and she received her Ph.D. and MBA from the NYU Stern School of Business.

**Paul Johnson** is managing director at Nicusa Investment Advisors and an adjunct associate professor of finance at the Fordham University Gabelli School of Business, where he teaches courses in value investing and fintech. Johnson has taught Value Investing at Columbia University for more than 20 years and he has received the Best Teacher Award from both the Gabelli School and Columbia Business School. He is the co-author of Pitch the Perfect Investment (Wiley, 2017).

**Evangelos “Evan” Katsamakas** is a professor of information systems at the Fordham University Gabelli School of Business. He is also the associate director of the University's Center for Digital Transformation. Katsamakas holds a Ph.D. from the NYU Stern School of Business and an M.Sc. from the London School of Economics. His research analyzes the business and economic impact of digital technologies, focusing on digital strategy, digital transformation, networks and platforms, and open innovation. His research interests also include economics and game theory modeling, econometrics, and dynamic simulation of complex systems. Katsamakas' research has appeared in Management Science, Journal of MIS, System Dynamics Review, International Journal of Medical Informatics, and in other major academic journals, conference proceedings, and books. He served as guest editor of the fall 2008 System Dynamics Review special issue on the dynamics of information systems. He teaches a variety of graduate and undergraduate business courses, including E-Business Strategies and Applications, Cloud Computing, Tech Startups, Systems Development, and Systems Analysis and Design.

**Asani Sarkar** is an assistant vice president at the Federal Reserve Bank of New York. His paper, “Stigma in Financial Markets: Evidence from Liquidity Auctions and Discount Window Borrowing During the Crisis,” received the 2011 Western Finance Association (WFA) Pearson Award for the best paper on financial institutions and markets. In the past, Sarkar has also held positions at Princeton University, Columbia University, and the University of Illinois at Urbana-Champaign. He research currently focuses on liquidity regulations, too-big-to-fail risk, bitcoin, corporate bond markets, and the real effects of the Federal Reserve’s liquidity provision programs during the crisis. Sarkar’s papers have appeared in the Journal of Finance, the Journal of Financial Economics, the Review of Financial Studies, the Journal of Financial and Quantitative Analysis, the Journal of Business, the Journal of Empirical Finance, and the Journal of Financial Intermediation. Sarkar received his Ph.D. from the University of Pennsylvania.

**Michael Sternberg** is managing director and head of quantitative analytics, New York, at RBC Capital Markets. Michael joined RBC Capital Markets recently to head the Global Quant group within the Global Markets group, working with the Sales and Trading group. He was previously a managing director at Morgan Stanley, which he joined in 1995 to run the MBS Structuring team. He most recently worked in London, where he ran risk analytics in the Risk Management Division. He also ran many global front-office quant teams during his tenure at Morgan Stanley, including Fixed Income, Investment Banking, Wealth Management, and XVA Trading teams. Before joining Morgan Stanley, Sternberg ran the Financial Strategies group and focused on Mortgage-Backed and Asset-Backed Securitization at Prudential Securities. He started in the industry in 1986 in the First Boston Corporation’s Mortgage Department. He holds a B.A. in economics from the University of California at Berkeley.

**Macrae Sykes** is a portfolio manager and research analyst at GAMCO Investors Inc. Mac co-manages the Gabelli Global Infrastructure Fund and leads the annual Gabelli institutional leadership conference at the Berkshire Hathaway Annual Meeting. He was previously ranked the No. 1 analyst by The Wall Street Journal’s Best on the Street Analyst Survey. Sykes is often quoted and interviewed by Barron’s, Bloomberg, CNBC, The Financial Times, and other prominent media outlets. He received his MBA from Columbia Business School in 2008.

**Yi Tang** is an associate professor of finance and the Robert B. McKeon Chair in Business at the Fordham University Gabelli School of Business. He received his Ph.D. in finance from Baruch College, CUNY in 2008. Tang’s research covers asset pricing, behavioral finance, risk management, corporate finance, and international finance. His work has been accepted for publication in top-tier journals, including the Journal of Financial Economics, the Journal of Financial and Quantitative Analysis, Management Science, Review of Financial Studies, and many leading field journals. His work has also been presented at world-renowned finance/economics conferences hosted by organizations such as the American Finance Association, the Western Finance Association, and the American Economic Association. His article on investor demand for lottery-type stocks and the betting-against-beta effect won the 2014 Jack Treynor Prize, an annual prestigious award sponsored by the Q Group.

**Yesha Yadav** is a professor of law at Vanderbilt Law School. Her research interests lie in the area of financial and securities regulation, notably with respect to the evolving response of regulatory policy to innovations in financial engineering, market microstructure, and globalization. Before joining Vanderbilt's law faculty in 2011, Yadav worked as a legal counsel with the World Bank in its Finance, Private-Sector Development, and Infrastructure unit, where she specialized in financial regulation and insolvency and creditor-debtor rights. Before joining the World Bank in 2009, she practiced from 2004 to 2008 in the London and Paris offices of Clifford Chance, in the firm's Financial Regulation and Derivatives group. As part of her work in the area of payments regulation, she was assigned to advise the European Payments Council on the establishment of the Single Euro Payments Area (SEPA), an initiative that seeks to integrate the domestic payments markets legally and operationally across the European Economic Area and Switzerland. Yadav has also served as a senior research associate and interim research director to the Committee on Capital Markets Regulation. Since joining Vanderbilt, Yadav has served as honorary adviser to India’s Financial Services Law Reform Commission (FSLRC) and on the Atlantic Council’s Task Force on Divergence and the Transatlantic Financial Reform and G-20 Agenda. She has also recently joined the CFTC’s Tech Advisory Committee. She earned an M.A. in law and modern languages with First Class honors at the University of Cambridge, after which she earned an LL.M. at Harvard Law School, where she focused on financial and capital markets regulation, payment systems, and terrorist financing. Yadav teaches Securities Regulation, Corporate Bankruptcy, International Financial Regulation, and Market Microstructure. She was honored in 2015 as a winner of the Hall-Hartman Prize Outstanding Professor Award for excellence in teaching.

**Tyler Yang** has more than 28 years of experience in financial engineering and mortgage risk management. His specialties include affordable housing policies, international housing finance systems, risk-based capital, mortgage termination analytics, and fixed and structured securities. He has wide-ranging project management experience, ensuring the timely delivery of high quality results within budget, even under extremely tight timelines. Yang is a patent owner of HAPN™, an innovative, affordable, and sustainable shared equity homeownership tool. He has published many articles in prestigious academic journals and frequently gives speeches at professional seminars and conferences. He was ranked one of the top real estate researchers in the world over the past two decades by the Journal of Real Estate Literature. He is also active in several academic and practitioner organizations, is ex-President of the Asian Real Estate Society, and co-editor of several leading real estate finance journals. Prior to founding IFE Group, Yang held several positions, including senior director of credit portfolio engineering at Freddie Mac, director of housing finance at PricewaterhouseCoopers LLP, and senior research economist at Fannie Mae. He has also taught at a number of universities. Yang received his M.S. and Ph.D. in finance and a master’s degree in Architecture from the University of Illinois at Urbana-Champaign.

**RESEARCH PAPER ABSTRACTS**

**Sanjiv Das**
The Future of Modeling and Machine Learning in Fintech

Why is fintech going to be a disruptive force in many areas of finance? The framework for the future of fintech includes ten areas of substantive impact, and the current confluence of business and technology drivers are going to result in huge changes in these areas. The role of a few technologies in particular need to be explored, such as deep learning, network models, blockchains, and robots in the areas of trading, risk management, and wealth management. In the future, banks will become technology companies, and the winners will be the ones who invest in R&D.

**Hanna Halaburda**
Blockchain Revolution without the Blockchain

Blockchain technologies have attracted a lot of attention. However, the technology is for the most part not well understood. There is no consensus on what benefits it may really bring, or on how it may fail. Upon carefully looking into the technology, it turns out that, for many applications, most of the proposed benefits of blockchain technologies do not really come from elements that are unique to blockchain. Instead, they come from more conventional elements, such as encryption and smart contracts. It also appears that beneficial applications of a distributed ledger are much more limited than beneficial applications of encryption and smart contracts. Moreover, even those applications that would benefit from a distributed system may benefit more from a different design of a distributed database than what blockchain proposes.

**Julapa Jagtiani**
with Catharine Lemieux
The Roles of Alternative Data Sources, Big Data, and Machine Learning in the New Financial Landscapes

Fintech is increasingly shaping financial and banking landscapes. Banks have been concerned about the uneven playing field because fintech lenders are not subject to the same rigorous oversight. There have also been concerns about the use of alternative data sources by fintech lenders and the impact on financial inclusion. In this paper, we explore the advantages/disadvantages of loans made by a large fintech lender and similar loans that were originated through traditional banking channels. Specifically, we used account-level data from the Lending Club and Y-14M bank stress test data. We found that Lending Club’s consumer lending activities have penetrated areas that could benefit from additional credit supply, such as areas that lose bank branches and those in highly concentrated banking markets. We also found a high correlation between interest rate spreads, Lending Club rating grades, and loan performance. However, the rating grades have a decreasing correlation with FICO scores and debt-to-income ratios, indicating that alternative data is being used and performing well so far. Lending Club borrowers are, on average, more risky than traditional borrowers given the same FICO scores. The use of alternative information sources has allowed some borrowers who would be classified as subprime by traditional criteria to be slotted into better loan grades and therefore get lower priced credit. And, for the same risk of default, consumers pay smaller spreads on loans from the Lending Club than from traditional lending channels.

**Asani Sarkar**
with Alexander Kroeger
The Law of One Bitcoin Price?

Bitcoin, a digital currency, constitutes a textbook example where the law of one price should be satisfied but isn’t. Unlike asset pairs previously studied in the literature, bitcoin is a fully fungible asset with identical payoffs. Despite this, we show the existence of persistent, statistically significant differences between U.S. dollar-denominated bitcoin prices in multiple bitcoin exchanges. We argue that the price difference has two components. One is the presence of microstructure friction, such as the bid-ask spread, order book depth, volatility that is negatively related to volume, and market segmentation. The second is what might be called an illegality premium created by the use of bitcoin to avoid foreign exchange restrictions, money laundering, etc. We find evidence that microstructure frictions explain part, but not all, of the price differences. For example, the absolute values of price differences are positively related to the bid-ask spread, order book depth, and volatility that is negatively related to volume. Price differences are also higher on exchanges with smaller trade sizes, which is consistent with clientele effects from greater institutional trading. Moreover, impulse responses indicate that shocks to illiquidity and volatility have more persistent effects on absolute price differences between exchange pairs with more retail trading and greater counterparty risk. Finally, the speed of arbitrage and the amount of price discovery is related to the arbitrage frictions. Thus, limits to arbitrage remain relevant even in the context of a homogeneous asset class where many of the frictions in more traditional asset markets are absent. In ongoing work, we are quantifying this illegality premium using a number of innovative measures of illegality.

**Yi Tang**
How Much Fintech is in Your Bank? The Fintech Footprint in Bank Returns

Traditional banks provide a myriad of services to online financial startups, services that integrate fintech into established financial services firms. We use principal component analysis applied to call report data to develop an empirical metric, the “fintech score,” which measures the interconnectedness between a traditional bank and fintech services. We study the relationship between the fintech score and bank stock returns, and we have found that bank diversification into fintech lowers bank risk and future stock returns.

**Yesha Yadav**
with Chris Bummer
Fintech and the Innovation Trilemma

Regulators around the world have made it a top policy priority to respond to the exponential growth of financial technology—known as fintech—in the post-crisis era. Mapping traditional regulatory strategies to new technological ecosystems has, however, proven conceptually difficult. Part of the challenge lies in the inherent tradeoffs involved in the complex work of supervising technologies that can both help and hurt consumers and market participants. Problems also arise from the common assumption that today’s fintech is a mere continuation of the story of innovation that has shaped finance for centuries. A novel theoretical framework for understanding and regulating fintech shows how today's supervision of financial innovation is invariably bound by what can be described as a policy trilemma. Specifically, when seeking to provide clear rules, maintain market integrity, and encourage financial innovation, regulators have long been able to achieve, at best, two out of the three goals. Moreover, today's innovations exacerbate these tradeoffs by introducing complexity and regulatory uncertainty as young startups routinely disintermediate Wall Street incumbents and reconfigure traditional financing operations with exciting but untested products and services. To address these challenges, a reconceptualization of existing regulatory strategies as operating across a spectrum of possible responses is needed, including supplemental administrative tools to support not only market but also regulatory experimentation.