

# SHAWN MANKAD

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## PERSONAL INFORMATION

### Educational Background

- Ph.D., Statistics, University of Michigan, 2013
- M.A., Statistics, University of Michigan, 2012
- B.S., Mathematics, Carnegie Mellon University, 2008

### Academic and Professional Appointments

- Assistant Professor of Management, Poole College of Business, North Carolina State University, 2021 – Present
- Assistant Professor of Operations, Technology and Information Management, Samuel Curtis Johnson Graduate School of Management, Cornell University, 2015 – Present
  - Graduate Field Member in Statistics, Applied Economics and Management
  - Clifford H. Whitcomb Faculty Fellow, 2020-2021
- Visiting Scholar, Federal Reserve Bank of Philadelphia, September 2021 – December 2021
- Assistant Professor of Business Analytics, Robert H. Smith School of Business, University of Maryland, 2013 – 2015
  - Affiliate Faculty of Applied Mathematics and Scientific Computation, University of Maryland, 2014 – 2015
- Federal Contractor, the U.S. Commodity Futures Trading Commission, 2009 – 2013
- Dissertation Intern, Federal Reserve Board of Governors, Summer 2012

## RESEARCH ACTIVITIES

### Publications

#### Operations Management and Information Systems

1. “Evidence of the Unintended Scheduling Implications of Minimum Wage”, with Qiuping Yu and Masha Shunko, Accepted at *Manufacturing & Service Operations Management*, 2022.
2. “[When a Higher Minimum Wage Leads to Lower Compensation](#)”, with Qiuping Yu and Masha Shunko, *Harvard Business Review* (digital article), 2021.
3. “Service Quality Using Text Mining: Measurement and Consequences”, with Jorge Mejia and Anandasivam Gopal, *Manufacturing & Service Operations Management* 23, (6): 1354-1372, 2021.

4. “A for Effort? Using the Crowd to Identify Moral Hazard in NYC Restaurant Hygiene Inspections”, with Jorge Mejia and Anandasivam Gopal, *Information Systems Research*, 30:4, 1363-1386, 2019
5. “Understanding Online Hotel Reviews through Automated Text Analysis”, with Hyun Jeong Han, Joel Goh, and Srinagesh Gavirneni, *Service Science* 8.2, 124-138, 2016.
6. “What Guests Really Think of Your Hotel: Text Analytics of Online Customer Reviews”, with Hyun Jeong Han, Srinagesh Gavirneni, and Rohit Verma. *Cornell Hospitality Report*, 16(2), 3-17, 2016.

## Finance

7. “Sidedness in the Interbank Market”, with Celso Brunetti and Jeffrey H. Harris, *Journal of Financial Markets*, 100663, 2021.
8. “Interconnectedness in the Interbank Market”, with Celso Brunetti, Jeffrey H. Harris, and George Michailidis, *Journal of Financial Economics*, 133(2), 520-538, 2019.
9. “On the Formation of Dodd-Frank Act Derivatives Regulations”, with George Michailidis and Andrei Kirilenko. *PLoS One*, 14(3), p.e0213730, 2019.
10. “Discovering the Ecosystem of an Electronic Financial Market with a Dynamic Machine-Learning Method”, with George Michailidis and Andrei Kirilenko, *Algorithmic Finance*, 2:2, 151-165, 2013.

## Statistics and Data Science

11. “CP-Squared: A Method for Change-Point Detection in Core-Periphery Networks”, with Desheng Ma, Accepted at *Expert Systems with Applications*, 2022.
12. “Monitoring Sparse and Attributed Networks with Online Hurdle Models”, with Samaneh Ebrahimi, Mostafa Reisi, and Kamran Paynabar, *IISE Transactions* (formerly *IIE Transactions*), Vol. 54(1), 91-104, 2021.
13. “A Two-Stage Authorship Attribution Method using Text and Structured Data for De-Anonymizing User Generated Content”, with Matthew Schneider, *Customer Needs and Solutions*, 1-18, 2021.
14. “An Online Semi-NMF Algorithm for Soft-Clustering of Financial Institutions”, with Yuan Cheng, *Proceedings of the SIGMOD Data Science for Macro Modeling Workshop*, 2019.
15. “Single Stage Prediction with Online Reviews for Mobile App Development and Management”, with Shengli Hu and Anandasivam Gopal, *The Annals of Applied Statistics*, Vol. 12(4), 2279-2311, 2018.

16. “Balance Sheet Driven Probability Factorization for Inferring Bank Holdings: Extended Abstract”, with Celso Brunetti and Jeffrey H. Harris, *Proceedings of the SIGMOD Data Science for Macro Modeling Workshop*, 2017.
17. “Measuring Influence in Twitter Ecosystems using a Counting Process Modeling Framework”, with Donggeng Xia and George Michailidis, *Technometrics*, Vol. 58(3), 360-370, 2016.
18. “Analysis of Multiview Legislative Networks with Structured Matrix Factorization: Does Twitter Influence Translate to the Real World?”, with George Michailidis, *The Annals of Applied Statistics* Vol. 9(4), 1950-1972, 2015.
19. “Two-Stage Plans for Estimating the Inverse of a Monotone Function”, with Runlong Tang, Moulinath Banerjee, and George Michailidis, *Technometrics*, Vol. 57, Iss. 3, 2015.
20. “Threshold Value Estimation Using Adaptive Two-Stage Plans in R”, with George Michailidis, and Moulinath Banerjee, *Journal of Statistical Software*, 67(3), 1 – 19, 2015.
21. "Biclustering Three-Dimensional Data Arrays with Plaid Models", with George Michailidis, *Journal of Computational and Graphical Statistics*, Vol. 23, Iss. 4, 2014.
22. “Visual Analytics for Network- Based Market Surveillance”, with George Michailidis and Celso Brunetti, *Proceedings of the SIGMOD Data Science for Macro Modeling Workshop*, 2014.
23. “Discovery of Path-Important Nodes using Structured Semi-Nonnegative Matrix Factorization”, with George Michailidis, *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, 288-291, 2013.
24. “Structural and functional discovery in dynamic networks with non-negative matrix factorization”, with George Michailidis, *Physical Review E*, 88(4), 042812, 2013.

#### **Computational Biology and Medicine**

25. “A Feedback and Evaluation System that Provokes Minimal Retaliation by Trainees”, with Keith Baker and Bishr Haydar, *Anesthesiology*, 126:327-337, 2017.
26. “Computational and Empirical Studies Predict Mycobacterium tuberculosis-Specific T Cells as a Biomarker for Infection Outcome”, with Marino, S., Gideon, H. P., Gong, C., McCrone, J. T., Lin, P. L., Linderman, J. J., Flynn, J. L., Kirschner, D. E., *PLoS Comput Biol* 12(4): e1004804, 2016.

#### **Working Papers**

1. “Bayesian Semi-Non-Negative Matrix Factorization: A Technique for Estimating Bank Holdings and Systemic Risk”, with Celso Brunetti and Jeffrey H. Harris, In revision at *Operations Research*.

2. “Non-Standard Errors”, with Albert J. Menkveld, Anna Dreber, Felix Holzmeister, Juergen Huber, Magnus Johannesson, Michael Kirchler, Sabastian Neususs, Michael Razen, Utz Weitzel, and others. In revision at *Journal of Finance*.
3. “A Structural Topic Sentiment Model for Text Analysis”, with Li Chen, In revision at *Management Science*.
4. “Too Close for Comfort? Understanding Peer Effects in Large Franchised Networks”, with Qiuping Yu and Masha Shunko, In revision at *Production and Operations Management*.
5. “Protecting the Anonymity of Online Users Using Prior Distributions on their Textual Content”, with Cameron Bale, Matthew Schneider and Monika Hu, Under review at *Journal of the Royal Statistical Society: Series C*.
6. “Liquidity Networks, Interconnectedness, and Interbank Information Asymmetry”, with Celso Brunetti and Jeffrey H. Harris, Under review at *Journal of Financial and Quantitative Analysis*.
7. "Can Machines Learn to be Human? Integrating Artificial Intelligence and Behavioral Science.", with Charles Corbett, Andrew M. Davis, and Elena Katok, In-progress forum article for *Manufacturing & Service Operations Management*.

### **Patents**

1. “Identification and personalized protection of text data using Shapley values”, Provisional patent (submitted), Cornell University and Drexel University

### **External Funding and Research Grants**

- NSF BIGDATA: Too Interconnected to Fail? Network Analytics on Complex Economic Data Streams for Monitoring Financial Stability, PI, \$525,247, 2016 – 2021
- Wharton Customer Analytics Initiative Data Grant, 2015
- Wharton Customer Analytics Initiative Data Grant, 2014

### **Research Recognition**

- CDO Magazine's 2021 List of Leading Academic Data Leaders
- “CHR 2017 Industry Relevance Award”, 2017, Cornell University, Given to a single paper each year
- Cornell University Half-Century Faculty Research Fellowship, 2016 - 2018
- 1st Place Award in Student Research Competition, Midwest Statistics Research Colloquium, 2012, Midwest Statistics Research Colloquium

### **Advising**

*Graduated -- Doctoral*

- Piyush Anand (Management: Marketing), Cornell University, Graduated Spring 2021, Committee Member, Assistant Professor at Rice University
- Saram Han (Hotel Administration), Cornell University, Graduated Fall 2019, Committee Member
- Shengli (Meredith) Hu (Management: Operations, Technology, and Information Management), Cornell University, Graduated Summer 2019, Committee member, Research Scientist at Dataminr
- Samaneh Ebrahimi (Industrial Engineering), Georgia Institute of Technology, Graduated Summer 2018, Thesis Committee Member, Data Scientist at Pandora
- Zhiming Shen (Computer Science), Cornell University, Graduated Fall 2017, Thesis Committee Member, Post-doc at Cornell University
- Hechao Sun (Applied Statistics), University of Maryland, Graduated Summer 2017, Thesis Committee member, Amazon Data Science
- Jorge Mejia (Information Systems), University of Maryland, Graduated Spring 2016, Thesis Committee member, Assistant Professor at Indiana University
- Bin Han, (Applied Mathematics), University of Maryland, Graduated Spring 2015, Thesis Committee member, Blackrock
- Stuart Price, (Decisions, Operations & Information Technologies), University of Maryland, Graduated Winter 2015, Thesis Committee member
- Hisham Talukder, (Applied Mathematics), University of Maryland, Graduated summer 2014, Thesis Committee member, Dow Jones & Company

#### *Graduated -- Masters*

- Shivank Goel (Management: Operations, Technology, and Information Management), Cornell University, Graduated Fall 2020, Amazon Software Engineer

#### **Undergraduate**

- Theodore Michalik, Graduated Spring 2015 from University of Maryland, Thesis Advisor

## **TEACHING ACTIVITIES**

### **Courses Taught**

#### **Cornell:**

- NBA-6920, Machine Learning Applications in Business
  - Evaluation Spring 2021: Instructor = 4.64/5; Course = 4.51/5
  - Evaluation Spring 2020: Instructor = 4.69/5; Course = 4.63/5
- NBA-6550, Introduction to SQL & Tableau
  - Evaluation Spring 2021: Instructor = 4.65/5; Course = 4.40/5
  - Evaluation Spring 2020: Instructor = 4.61/5; Course = 4.43/5
- NBA-6550Y, Introduction to SQL (Summer Session)
  - Evaluation Summer 2021: Instructor = 4.85/5; Course = 4.80/5
  - Evaluation Summer 2019: Instructor = 4.82/5; Course = 4.72/5
- NBA-6480, Digital Technology Practicum

- Evaluation Spring 2021: Instructor = 4.72/5, 4.75/5; Course = 4.04/5, 4.38/5
- Evaluation Spring 2020: Instructor = 4.46/5; Course = 3.89/5

#### **University of Maryland:**

- “Distinguished Teaching Award”, 2015, University of Maryland awarded to faculty in the top 15% of teaching evaluation scores
- BMGT 431, Data Analytics
- BUDT 758B, Google Online Challenge and Analytics
- BMGT 430, Linear Statistical Models in Business

#### **University of Michigan:**

- “Graduate Student Instructor Excellence in Teaching Award” for an undergraduate-level course in Data Mining, 2011, University of Michigan Statistics Department

## **SERVICE AND OUTREACH**

### **Editorial Boards and Reviewing Activities**

#### **Editorial Boards for Journals and Presses**

- Associate Editor for *Data Science in Science* (2022-Present)
- Editorial Advisory Board (2018-2021) for *Expert Systems with Applications*

#### **Reviewing Activities for Journals and Presses**

#### **Operations Research/Management Journals:**

- Management Science
- Manufacturing and Service Operations Management
- Operations Research
- Production and Operations Management
- IIE Transactions

#### **Information Management/Systems Journals:**

- Information Systems Research
- Management Information System Quarterly
- European Journal of Information Systems

#### **Finance Journals:**

- Management Science
- Mathematics and Financial Economics
- Journal of Multinational Financial Management

### Applied Statistics and Data Science Journals:

- Journal of the American Statistical Association
- Journal of Computational and Graphical Statistics
- Applied Stochastic Models in Business and Industry
- Journal of Statistical Software
- Journal of Applied Statistics
- The Electronic Journal of Statistics
- INFORMS Journal on Computing
- Expert Systems with Applications
- Social Network Analysis and Mining
- Artificial Intelligence Review

### **Reviewing Activities for Conferences**

- 2020 INFORMS Workshop on Data Science
- 2019 INFORMS Workshop on Data Science
- 2018 INFORMS Workshop on Data Science
- SIGMOD 2018 Workshop – Data Science for Macro-Modeling
- IIE ISERC 2015
- Winter Simulation Conference 2015
- SIGMOD Data Science for Macro-Modeling Workshop 2014
- IEEE Workshop on Computational Advances in Multi-Sensor Adaptive Processing 2014

### Committees, Professional & Campus Service

#### **Leadership Roles in Meetings and Conferences**

- Conference Co-Chair; 2021 INFORMS Workshop on Data Science
- Associate Editor for the AI and Intelligent Augmentation track, International Conference on Information Systems 2020
- Member of Program Committee, 2020 INFORMS Workshop on Data Science
- Member of Program Committee, 2019 INFORMS Workshop on Data Science
- Member of Program Committee, [Federal Reserve Board Conference on The Interconnectedness of Financial Systems](#), 2019
- Member of Program Committee, 2018 INFORMS Workshop on Data Science
- Associate Editor for the Data Science track, International Conference on Information Systems 2018
- Member of the Organizing Committee, 2018 Symposium on Data Science and Statistics
- Panelist for Academic Job Search Panel at INFORMS 2018
- Invited Member of the 3<sup>rd</sup> Workshop on an Open Knowledge Network (organized by the [NITRD Big Data Interagency Working Group](#), National Science Foundation, and the National Institute of Health) 2017
- Publicity Co-Chair for the 2017 INFORMS Workshop on Data Science

- Associate Editor for the Foundations of IS Research track, International Conference on Information Systems 2017
- Associate Editor for the Data Science track, International Conference on Information Systems 2016
- Organizer and Session Chair, Invited Data-Mining Session Organizer, the 2016 INFORMS annual meeting
- Member of the Program Committee, SIGMOD 2016 Workshop – Data Science for Macro-Modeling
- Member of the Program Committee, Interface 2015 (Statistics Symposium)
- Member of the Program Committee, SIGMOD 2014 Workshop – Data Science for Macro-Modeling
- Session Organizer and Chair, Data-Mining section, 2014 INFORMS annual meeting
- Session Chair, 2014 Joint Statistical Meetings Session

#### **Other Non-University Committees, Memberships, Panels, etc.**

- Secretary, Treasurer of the Data Mining Section of INFORMS, 2013 – 2015

#### **Campus Service - College**

- Cornell University Reappointment Review Committee for Lecturer (Hotel School), 2017- 2018
- University of Maryland Member of Research Computing Committee, 2014 – 2015

#### **Campus Service - Department**

- Faculty advisor for the [Cornell Quant Club](#), 2020 - Present
- Faculty advisor for the Cornell Fin Tech Club, 2021 - Present
- University of Maryland Research Computing Infrastructure Survey Team, 2014

## **SELECTED MEDIA COVERAGE**

#### **Research**

1. June 23, 2021, “[A Higher Minimum Wage Can Lead Employers to Lower Compensation](#)”, *Bloomberg*
2. June 22, 2021, “[More Hidden Costs in the Fight for \\$15](#)”, *The Wall Street Journal*
3. Feb 22, 2019, “[A Breakthrough Is Claimed in Systemic Risk Monitoring](#)”, *GARP Risk Intelligence*
4. Dec 6, 2018, “Restaurant Hygiene, Risky Business Systems”, <https://research.cornell.edu/news-features/restaurant-hygiene-risky-business-systems>
5. Nov 11, 2018, “Thanks, statistics! A faster way to improve mobile apps”, *Cornell Chronicle*, <http://news.cornell.edu/stories/2018/11/thanks-statistics-faster-way-improve-mobile-apps>
6. Sept 12, 2018, “Fed study proposes method for tracking banks’ systemic risks more often”, *MLex Insight*



7. July 11, 2018, "Bank network shifts signaled financial crisis -- and may prevent another", EurekaAlert!, [https://eurekaalert.org/pub\\_releases/2018-07/cu-bns071018.php](https://eurekaalert.org/pub_releases/2018-07/cu-bns071018.php)
8. Mar 11, 2016, "Cornell study analyzes TripAdvisor reviews to help hotel managers", *Tnooz* <http://www.tnooz.com/article/cornell-study-analyzes-tripadvisor-reviews-to-help-hotel-managers/>
9. Mar 8, 2016, "Online hotel reviews only partially tell what customers really think", *Cornell Chronicle* <http://www.news.cornell.edu/stories/2016/03/online-reviews-only-partially-reveal-what-hotel-customers-think>
10. Feb 12, 2016, "Text Analytics Reveal the Impact of Guest Sentiment on Hotel Review Scores", *HospitalityNet*
11. Feb 11 2016, "What Guests Really Think of Your Hotel: Text Analytics of Online Customer Reviews", *Hotel News Resource*
12. Nov 8, 2015, "Yelp Gets A 4.5 Star Rating", *Seeking Alpha*
13. Mar 2015, "MSN Money Show" profiles brand-enthusiasm index, referenced here: <http://www.czarmetrics.com/blog/2015/1/26/second-annual-emerging-brands-study-the-best-of-the-best-1>
14. Feb 26 2015, "Yelp as Prophet", *Biz Ed*
15. Dec 23 2014, "Online reviews help predict restaurant success", *Baltimore Daily Record*
16. Dec 16, 2014 *Washington Business Journal* <http://www.bizjournals.com/washington/blog/top-shelf/2014/12/umd-researchers-use-yelp-reviews-to-predict.html?page=all>
17. Dec 16, 2014 *InTheCapital* <http://inthecapital.streetwise.co/2014/12/16/dc-restaurant-closings-predicted-by-yelp-reviews/>
18. Dec 16, 2014, *Eater.com* - <http://www.eater.com/2014/12/16/7405117/can-yelp-reviews-predict-restaurant-shutters>
19. Mar 2014, "Do Regulators Listen to Public? Study Says Yes", *The Wall Street Journal, Compliance Building*
20. Dec 15, 2014, *Hospitality Industry News* [http://www.hospitality-industry.com/index.php/news/comments/researchers\\_use\\_text-mining\\_software\\_to\\_predict\\_success\\_failure\\_of/](http://www.hospitality-industry.com/index.php/news/comments/researchers_use_text-mining_software_to_predict_success_failure_of/)
21. Jan 2014, "Academic devise formula to gauge how well U.S. regulators listen", *Reuters, Chicago Tribune*

## Teaching

1. Aug 6, 2018, "Data Science in MBA Programs: Rosy Job Prospects", *find-mba.com*, <https://find-mba.com/articles/data-science-in-mba-programs-rosy-job-prospects>
2. Feb 17, 2016, "Business Analytics Master's Growth Gathers Pace As Big Data Demand Outstrips Supply", *Business Because*
3. Jan 19 2016, "Cornell To Launch Big Data-Focused MBA Program Featuring Twitter, Yahoo, Amazon", *Business Because*