

PARAM VIR SINGH

Distinguished Fellow, INFORMS Information Systems Society
Carnegie Bosch Chair Professor of Business Technologies & Marketing
Director, PNC Center for Financial Services Innovation
David A. Tepper School of Business
Carnegie Mellon University
Pittsburgh, Pa 15213

March, 2020

EDUCATION

- 2008 PhD, Information Systems, Michael G. Foster School of Business, University of Washington, Seattle, WA.
- 2008 M.S. in Business Administration, Michael G. Foster School of Business, University of Washington, Seattle, WA.
- 2004 M.A. in Interdisciplinary Studies, Texas Tech University, Lubbock, TX.
- 2000 B.E. in Chemical Engineering, Department of Chemical Engineering and Technology, Panjab University, Chandigarh, India.

POSITIONS HELD

- 2019 Jul- Carnegie Bosch Professor of Business Technologies and Marketing, Tepper School of Business, Carnegie Mellon University
- 2017 Nov- Director, PNC Center for Financial Services Innovation.
- 2016- 2019 Associate Professor of Business Technologies with Indefinite Tenure, Tepper School of Business, Carnegie Mellon University.
- 2016- Carnegie Bosch Associate Professor of Business Technologies
- 2013-2016 Associate Professor of Business Technologies without Indefinite Tenure, Tepper School of Business, Carnegie Mellon University.
- 2013- Courtesy Appointment as Professor Heinz College, Carnegie Mellon University.
- 2012-2016 Carnegie Bosch Junior Chair of Business Technologies.

2010-2011 Faculty Giving Chair of Business Technologies
2008-2013 Assistant Professor of Information Systems,
Tepper School of Business,
Carnegie Mellon University.

STUDENT SUPERVISION

Doctoral Student Supervision (at Carnegie Mellon)

Shunyuan Zhang (Co-Chair, Thesis Committee) (Tepper School of Business) (2019)
(Thesis Title: A Structural Analysis of Sharing Economy Leveraging Location and Image Analytics Using Deep Learning)
(Currently Assistant Professor of Marketing, **Harvard Business School**)

Elina Hwang (Co-Chair, Thesis Committee) (Tepper School of Business) (2014)
(Thesis Title: Knowledge Sharing and Creation through Social Media in Organizations)
(Currently Assistant Professor, **University of Washington**)
Winner: Herbert A. Simon Doctoral Dissertation Award in Behavioral Research in the Administrative Sciences.

Yan Huang (Co-Chair, Thesis Committee) (Heinz College) (2013)
(Thesis Title: Essays on Economics of Crowdsourcing and Enterprise Social Media)
(Currently Assistant Professor, **Carnegie Mellon University**)
Winner: William Cooper Doctoral Dissertation Award
Winner: INFORMS Information Systems Society Nunamaker-Chen Dissertation Award.

Yingda Lu (Co-Chair, Thesis Committee) (Tepper School of Business) (2012)
(Thesis Title: Essays in Social Media Platforms)
(Currently Assistant Professor, **University of Illinois at Chicago**)

Xiao Liu, (Member, Thesis Committee) (Tepper School of Business) (2015)
(Thesis Title: Marketing Solutions Enabled by Big Data Using Structural and Machine Learning Techniques)
(Currently Assistant Professor at **New York University**)
Winner: William Cooper Doctoral Dissertation Award

Quan Wang, (Member, Thesis Committee) (Heinz College) (2018)
(Thesis Title: Understanding Consumer Behavior with Cross-Channel Digital Marketing)
(Currently: Senior Research Scientist at **LinkedIn**)

Bo Reum Choi (Member, Thesis Committee) (Tepper School of Business) (2012)
(Thesis Title: Essays on Socialization in Online Groups)
(Currently Assistant Professor, **Ulsan National Institute of Science and Technology**, Republic of Korea)

Michelle Dufalla, (Member, Thesis Committee) (Tepper School of Business) (2014)

(Thesis Title: Essays on Service Operations Management)
(Currently: Business Analyst at **Materion Corporation**)

Runshan Fu, (Co-chair, Thesis Committee), (Research on Bias on Machine Learning) (Heinz College) (2015-)

Nikhil Malik, (Co-chair, Thesis Committee), (Bitcoin and Fintech research) (Tepper School of Business) (2016-)

Yijin Kim, (Member, Thesis Committee), (Research on Societal Impact of Machine Learning deployment) (Tepper School of Business) (2018-)

Qiaochu Wang, (Research on Economics of Algorithmic Transparency) (Tepper School of Business) (2019-)

Duyu Chen, (Research on Source of Algorithmic Bias) (Tepper School of Business) (2019-)

Doctoral Student Supervision (at other Universities)

Georgia Vilma Todri (Member, Thesis Committee) (2016)
Stern School of Business, New York University, NY
(Thesis Title: Modeling and Measuring Advertising Effectiveness with Atomic Data)
(Currently Assistant Professor at **Emory University**)

PUBLICATIONS

Articles in refereed journals:

22. Deep Learning for Computer Vision: Methods, Fairness, Causality and Interpretability, with Nikhil Malik. *Tutorials in Operations Research* at *Inform*s.

21. Trade-offs in Online Advertising: Advertising Effectiveness and Annoyance Dynamics Across the Purchase Funnel, with Georgia Vilma Todri and Anindya Ghose. Forthcoming at *Information Systems Research*.

20. Elina Hwang, Param Vir Singh, Linda Argote. Jack of All, Master of Some: Knowledge Network and Innovation, *Information Systems Research*, 30(2) 2019, 389-410.

19. Shunyuán Zhang, Param Vir Singh, Anindya Ghose. A Structural Analysis of the Role of Superstars in Crowdsourcing Contests. *Information Systems Research*, 30(1) 2019, 15-33.

18. Quan Wang, Beibei Li, Param Vir Singh. Copycats versus Original Mobile Apps: A Machine Learning Detection Method and Empirical Analysis. *Information Systems Research*, 29(2) 2018, 273-291.

17. Yingda Lu, Param Vir Singh, Baohong Sun. Is Core-Periphery Network Good for Knowledge Sharing? A Structural Model of Network Formation on a Crowdsourced Customer Support Forum, *Management Information Systems Quarterly*, 41(2) 2017, 607-628.
16. Xiao Liu, Param Vir Singh, Kannan Srinivasan. A Structured Analysis of Unstructured Big Data Leveraging Cloud Computing, *Marketing Science*, 35(3) 2016, 363-388.
15. Ray Reagans, Param Vir Singh and Ramayya Krishnan. Forgotten Third Parties: Analyzing the Contingent Association between Unshared Third Parties, Knowledge Overlap and Knowledge Transfer Relationships with Outsiders, *Organization Science*, 26(5) 2015, 1400-1414.
14. Elina Hwang, Param Vir Singh, Linda Argote. Knowledge Sharing in Online Knowledge Communities: Weakening of Categorical and Strengthening of Expertise Similarity with Experience, *Organization Science*, 26(6) 2015, 1593-1611.
13. Yan Huang, Param Vir Singh, Anindya Ghose. A Structural Model of Employee Behavioral Dynamics in Enterprise Social Media, *Management Science*, 61(12) 2015, 2825-2844.
12. Liye Ma, Alan Montgomery, Param Vir Singh, Michael Smith, An Empirical Analysis for the Impact of Pre-release Movie Piracy on Box Office Revenue, *Information Systems Research*, 25(3) 2014, 590-603.
11. Yan Huang, Param Vir Singh, Kannan Srinivasan. Crowdsourcing New Product Ideas under Consumer Learning, with Yan Huang and Kannan Srinivasan. *Management Science*, 60(9) 2014, 2138-2159.
10. Param Vir Singh, Nachiketa Sahoo, Tridas Mukhopadhyay. How to Attract and Retain Readers in Enterprise Blogging? *Information Systems Research*, 25(1), 2014, 35-52.
9. Yingda Lu, Kinshuk Jerath, Param Vir Singh. The Emergence of Opinion Leaders in a Networked Online Community: A Dyadic Model with Time Dynamics and a Heuristic for Fast Estimation, *Management Science*, 2013, 59(8), 1783-1799.
8. Param Vir Singh, and Corey Phelps. Networks, Social Influence and the Choice among Competing Innovations: Insights from Open Source Software Licenses, *Information Systems Research*, 2013, 24(3), 539-560.
7. Nachiketa Sahoo, Param Vir Singh, and Tridas Mukhopadhyay. A Hidden Markov Model of Collaborative Filtering. *Management Information Systems Quarterly*, 2012, 36(4), 1329-1356.
6. Rohit Aggarwal, Ram Gopal, Ramesh Sankaranarayanan, and Param Vir Singh. Blog, Blogger, and the Firm: Can Negative Posts by Employees Lead to Positive Outcomes. *Information Systems Research*, 2012, 23(2), 306-322
5. Param Vir Singh, Yong Tan, and Nara Youn. A Hidden Markov Model of Developer

Learning Dynamics in Open Source Software Projects. *Information Systems Research*, 2011, 22(4), 790-807.

4. Tridas Mukhopadhyay, Param Vir Singh, and Seung Hyun Kim. Learning Curves of Agents with Diverse Skills in Information Technology Enabled Physician Referral Systems. *Information Systems Research*, 2011, 22(3), 586-605.

[Runner up to *Best Published Paper* for 2011 for *Information Systems Research*]

3. Param Vir Singh, Yong Tan, and Vijay Mookerjee. Network Effects: The Influence of Structural Social Capital on Open Source Software Project Success. *Management Information Systems Quarterly*, 2011, 35(4), 813-829. (Appeared as lead research article).

2. Param Vir Singh. The Small World Effect: The Influence of Macro Level Properties of Developer Collaboration Networks on Open Source Project Success. *ACM Transactions of Software Engineering and Methodology*, 2010, 20 (2), 6:1-6:27.

1. Param Vir Singh and Yong Tan. Developer Heterogeneity and Formation of Communications Networks in Open Source Software Projects. *Journal of Management Information Systems*, 2010, 27(3) pp 179-210.

Working Papers:

Shunyuan Zhang, Dokyun Lee, Param Vir Singh, Kannan Srinivasan, How Much is an Image Worth? Estimating Airbnb Property Demand Leveraging Large Scale Image Feature Extraction. Revising for 4th round of review at *Management Science*.

Shunyuan Zhang, Dokyun Lee, Param Vir Singh, Tridas Mukhopadhyay. Demand Interactions in Sharing Economies: Evidence from Natural Experiment Involving Airbnb and Uber/Lyft. Revising for 2nd round of review at *Journal of Marketing Research*.

Runshan Fu, Yan Huang, Param Vir Singh. Crowd, Lending, Machine and Bias. Under 3rd round of review at *Information Systems Research*.

Nikhil Malik, Manmohan Aseri, Param Vir Singh, Kannan Srinivasan. Why Bitcoin Will Fail to Scale? Revising for 3rd round of review at *Management Science*.

Runshan Fu, Manmohan Aseri, Param Vir Singh, Kannan Srinivasan. "Un"fair Machine Learning Algorithms. Revising for 2nd round of review at *Management Science*.

Nikhil Malik, Param Vir Singh, Kannan Srinivasan. A Dynamic Analysis of Beauty Premium. Under 2nd round of review at *Marketing Science*.

Shunyuan Zhang, Nitin Mehta, Param Vir Singh, and Kannan Srinivasan, Investigating the Impact of Airbnb's Smart-Pricing Algorithm on Racial Disparities across Airbnb Hosts. Under 2nd round of review at *Marketing Science*.

Qiaochu Wang, Yan Huang, Stefanus Jasin, Param Vir Singh. Algorithmic Transparency with Strategic Users. Under 1st round of review at *Management Science*.

Shunyuan Zhang, Nitin Mehta, Param Vir Singh, Kannan Srinivasan. Do Low Quality Images Lead to Higher Returns at Airbnb?

Nikhil Malik, Urooj Khan, Param Vir Singh. Can Banks Survive the Next Financial Crisis?

Runshan Fu, Yan Huang, Param Vir Singh, Kannan Srinivasan, Do Machine Learning Algorithms Lead to Adverse Selection in Housing Market?

Yijin Kim, Nitin Mehta, Param Vir Singh, Kannan Srinivasan. Why Airbnb's Smart Pricing Algorithm is Naive?

Nikhil Malik, Nitin Mehta, Param Vir Singh, Kannan Srinivasan. Artificial Intelligence Algorithms & Feedback Loop.

Qiaochu Wang, Yan Huang, Param Vir Singh. Privacy Discrimination Under GDPR.

Articles in refereed conference proceedings:

Qiaochu Wang, Yan Huang, Param Vir Singh (2019), Algorithmic Transparency, *Conference on Information Systems and Technology*, Seattle, WA.

Runshan Fu, Manmohan Aseri, Param Vir Singh, Kannan Srinivasan (2019), "Un"fair Machine Learning Algorithms, *Conference on Information Systems and Technology*, Seattle, WA.

Nikhil Malik, Manmohan Aseri, Param Vir Singh (2018), Bitcoin Mining Cartels: Will Bitcoin ever Scale, *Workshop on Information Systems and Economics*, San Francisco, CA.

Runshan Fu, Yan Huang, Param Vir Singh (2018), Crowd Bias and Machine Learning: Evidence from Crowd Lending, *Workshop on Information Systems and Economics*, San Francisco, CA.

Nikhil Malik, Manmohan Aseri, Param Vir Singh (2018) Bitcoin Disruption in Payments: Winners and Losers, *Conference on Information Systems and Technology*, Phoenix, AZ. **Nominated for Best Student Paper Award.**

Shunyuan Zhang, Dokyun Lee, Param Vir Singh, Tridas Mukhopadhyay (2017) Sharing Effects of Sharing Economy: Evidence from a Natural Experiment Involving Airbnb and Uber/Lyft, *Workshop on Information Systems and Economics*, Seoul, South Korea.

Nikhil Malik, Param Vir Singh, Dokyun Lee, Kannan Srinivasan (2017) When Does Beauty Pay? A Large Scale Image Based Appearance Analysis on Career Transitions, *Conference*

on Information Systems and Technology, Houston, TX. **Winner Best Student Paper Award.**

Shunyuan Zhang, Dokyun Lee, Param Vir Singh, Tridas Mukhopadhyay (2017) Sharing Effects of Sharing Economy: Evidence from a Natural Experiment Involving Airbnb and Uber/Lyft, *Conference on Information Systems and Technology*, Houston, TX.

Shunyuan Zhang, Dokyun Lee, Param Vir Singh, Kannan Srinivasan (2016) How Much Is an Image Worth? An Empirical Analysis of Property's Image Aesthetic Quality on Demand at AirBNB, *International Conference in Information Systems*, Dublin, Ireland.

Shunyuan Zhang, Dokyun Lee, Param Vir Singh, Kannan Srinivasan (2016) Image Feature Extraction and Demand Estimation on Airbnb: A Deep Learning Approach, *Workshop on Information Systems and Economics*, Dublin, Ireland.

Shunyuan Zhang, Dokyun Lee, Param Vir Singh, Kannan Srinivasan (2016) Professional versus Amateur Images: Investigating Differential Impact on Airbnb Property Demand, *Conference on Information Systems and Technology*, Nashville, TN. **Winner Best Student Paper Award.**

Anindya Ghose, Param Vir Singh, Vilma Todri (2015) Trade-offs in Online Advertising: Modeling and Measuring Advertising Effectiveness and Annoyance Dynamics, *Workshop on Information Systems Economics*, Dallas, TX 2015.

Shunyuan Zhang, Param Vir Singh, Anindya Ghose (2015) Analyzing the Role of Superstars in crowdsourcing Contests: A Structural Model, *Conference on Information Systems and Technology*, Philadelphia, PA 2015.

Beibei Li, Param Vir Singh, Quan Wang (2014) Zoom in iOS Clones: Examining the Impact of Copycat Apps on Original App Downloads, *Workshop on Information Systems Economics*, Auckland, NZ 2014.

Beibei Li, Param Vir Singh, Quan Wang (2014) Zoom in iOS Clones: Examining the Antecedents and Consequences of Mobile App Copycats, *International Conference of Information Systems*, Auckland, NZ 2014.

Elina Hwang, Param Vir Singh, Linda Argote (2014) Jack of All, Master of Some: The Contingent Effect of Knowledge Breadth on Innovation, *International Conference of Information Systems*, Auckland, NZ 2014.

Beibei Li, Param Vir Singh, Quan Wang (2014) Zoom in iOS Clones: Examining the Impact of Copycats on Mobile App Downloads, *Conference on Information Systems and Technology*, San Francisco, CA 2014.

Elina Hwang, Param Vir Singh, Beibei Li (2014) Jack of All, Master of Some: The Interaction Effect of Knowledge Breadth and Depth on Innovation, *Conference on Information Systems and Technology*, San Francisco, CA 2014.

- Yan Huang, Param Vir Singh, and Tridas Mukhopadhyay (2012) How to Design Crowdsourcing Contests: A Structural Empirical Analysis, *Workshop of Information Systems and Economics*, Orlando Florida. 2012.
- Yan Huang, Param Vir Singh, and Tridas Mukhopadhyay (2012) Crowdsourcing Contests: A Dynamic Structural Model of the Impact of Incentive Structure on Solution Quality, *International conference of Information Systems*, Orlando Florida. 2012.
- Yan Huang, Param Vir Singh, and Kannan Srinivasan (2011) Crowdsourcing Blockbuster Ideas: A Dynamic Structural Model of Ideation, *Conference of Information Systems and Technology, Charlotte* 2011.
- Yingda Lu, Param Vir Singh, and Kannan Srinivasan (2011) How to Retain Smart Customers in Crowdsourcing Efforts? A Dynamic Structural Analysis of Crowdsourcing Customer Support and Ideation, *Conference of Information Systems and Technology, Charlotte* 2011.
- Yan Huang, Param Vir Singh, and Kannan Srinivasan (2011) Crowdsourcing Blockbuster Ideas: A Dynamic Structural Model of Ideation, *International Conference of Information Systems, Shanghai* 2011.
- Yingda Lu, Param Vir Singh, and Baohong Sun (2011) Learning From Peers on Social Media Platforms, *International Conference of Information Systems, Shanghai* 2011.
- Yingda Lu, Param Vir Singh, Kannan Srinivasan (2011) How to Retain Smart Customers in Crowdsourcing Efforts? A Dynamic Structural Analysis of Crowdsourcing Customer Support and Ideation, *Workshop on Information Systems and Technology, Shanghai* 2011.
- Yan Huang, Param Vir Singh, and Kannan Srinivasan (2011) Crowdsourcing Blockbuster Ideas: A Dynamic Structural Model of Ideation, *Workshop on Information Systems Economics, Shanghai* 2011.
- Yan Huang, Param Vir Singh, and Anindya Ghose (2010) An Empirical Analysis of Competitive Dynamics in Enterprise Social Media, *Workshop on Information Systems Economics, Saint Louis* 2010.
- Param Vir Singh, Nachiketa Sahoo, and Tridas Mukhopadhyay (2010) Seeking Variety: A Dynamic Model of Employee Blog Reading Behavior, *Workshop on Information Systems Economics, Saint Louis* 2010.
- Yan Huang, Param Vir Singh, and Anindya Ghose (2010) Show Me the Incentives: A Dynamic Structural Model of Employee Blogging Behavior, *International Conference of Information Systems, Saint Louis* 2010.
- Yingda Lu, Param Vir Singh, Baohong Sun (2010) Blind Men Can Judge No Color: A Dynamic Structural Model of Enterprise Expertise Sharing, *Workshop on Information Systems and Technology, Saint Louis* 2010.

Yan Huang, Param Vir Singh, and Anindya Ghose (2010) Show Me the Incentives: A Dynamic Structural Model of Employee Blogging Behavior, *Conference on Information Systems and Technology, Austin* 2010.

Yingda Lu, Param Vir Singh, Baohong Sun (2010) Blind Men Can Judge No Color: A Dynamic Structural Model of Enterprise Expertise Sharing, *Conference on Information Systems and Technology, Austin* 2010.

Yingda Lu, Kinshuk Jerath, and Param Vir Singh. The Emergence of Opinion Leaders in Online Review Communities. *Statistical Challenges in Electronic Commerce Research* (SCECR), 2010, *Austin*, Texas.

Param Vir Singh, Nachiketa Sahoo, and Tridas Mukhopadhyay. Modeling Blog Reading Dynamics. *Statistical Challenges in Electronic Commerce Research* (SCECR), 2010, *Austin*, Texas.

Param Vir Singh, Nachiketa Sahoo, and Tridas Mukhopadhyay. Modeling Blog Reading Dynamics. *Utah Information Systems Winter Conference*, 2010, *Salt Lake City*, Utah.

Liye Ma, Param Vir Singh, and Michael Smith. No Meaningful Impact: The Effect of Pre-release Piracy on Movie Box Office Sales. Proceedings of *Workshop on Information Systems Economics* (WISE), 2009, *Phoenix*, Arizona.

Param Vir Singh, Ray Reagans, and Ramayya Krishnan. Forbidden to Simmelian Ties: Dynamics of Expertise Sharing Communities. Proceedings of *Workshop on Information in Networks* (WIN), 2009, *New York City*, New York.

Rob Schonlau and Param Vir Singh. Board Networks and Merger Performance. *Financial Management Association's Annual Meeting*, 2009, *Reno*, Nevada.

Liye Ma, Param Vir Singh, and Michael Smith. No Meaningful Impact: The Effect of Pre-release Piracy on Movie Box Office Sales. *Statistical Challenges in Electronic Commerce Research* (SCECR), 2009, *Pittsburgh*, Pennsylvania.

Param Vir Singh. Open Source Software and the Small World Phenomenon: An empirical Investigation of Macro Level Network Properties on Project Success, Proceedings of *International Conference on Information Systems* (ICIS), 2007, *Montreal*, Canada.

Param Vir Singh, Yong Tan, and Vijay Mookerjee. Social Capital, Structural Holes and Team Composition: Collaborative Networks of the Open Source Software Community, Proceedings of *International Conference on Information Systems* (ICIS), 2007, *Montreal*, Canada.

Param Vir Singh, Corey Phelps, Ming Fan, and Yong Tan. Determinants of Open Source Software Development License Choice: A Social Influence Perspective, Proceedings of *Workshop on Information Systems and Economics* (WISE), 2007, *Montreal*, Canada.

Param Vir Singh and Yong Tan. Planning to First Release: A Conditional Hazard Function Approach for Investigating Open Source Software Development Time, Proceedings of *Workshop on Information Technology and Systems* (WITS), 2006, *Milwaukee, Wisconsin*, pp 127-133.

Param Vir Singh and Yong Tan. Stability and Efficiency of Communications Networks in Open Source Software Development, Proceedings of *Workshop on Information Technology and Systems* (WITS), 2005, *Las Vegas, Nevada*, pp 177-182.

Param Vir Singh and Eric Walden, Flexibility and Cost in IT Outsourcing: Balancing Opposing Goals, Proceedings of the *Americas Conference on Information Systems, Tampa, Florida*, August 4-6, 2003, pp. 1653-1663. **Nominated for Best Paper Award.**

Media Mentions:

Peter Holley, “Walmart has added virtual reality to its assessment of an employee’s potential,” July 12, 2019, Washington Post.

John Edwards, “Where to Get Trusted IT Planning Advice?,” July 17, 2019, Information Week.

Highlighted in Informs author spotlight for April 2018.
<https://pubsonline.informs.org/icymi/05-2018/authorspotlight>

Lachlan Carmichael, “EU’s new data protection rules come into effect,” May 25, 2018, Agence France-Presse (AFP)

Daniel Flatley, “Bitcoin could be a problem for U.S. Security Clearances,” May 22, 2018, Bloomberg.

Next Pittsburgh, “CMU’s new cryptocurrency, venture capitalists taking pitches and more: 5 things happening in Pittsburgh tech this week,” May 24, 2018.

Courtney Linder “Move over Bitcoin: There’s new cryptocurrency in town,” May 18, 2018, Pittsburgh Post Gazette.

Nora Mattson “Tepper Case Challenge Deals with CMU Coin,” Feb 11, 2018, The Tartan.

John Edwards, “How to Begin Integrating AI in to Data Center Operations,” Feb 21, 2018, Information Week.

James Martin, “7 Ways AI will Revolutionize Business Travel” Jun 14, 2017, CIO

Lisa Morgan, “Why Automation and AI are Cool, Until They are Not,” May 15, 2017, Information Week.

Courtney Linder, "Mo' Data, Mo' Problems: Information Systems Wrestle with Corporate Knowledge Loss," Aug 11, 2017, Pittsburgh Post-Gazette.

Ashley Murray, "Pittsburgh Zoo Reaches Out to Millennials with New App," Jul 10, 2017, Pittsburgh Post-Gazette.

Susan Adams, "Personal Blogging at Work increases Productivity" March 1, 2011, Forbes.

John Egen, "Blogging for Fun, Blogging for Work Should Harmonize in Corporate World" March 12, 2011, Technorati.

David Spark, "Prohibiting leisure blogging of employees has a negative effect on productive blogging" Jan 20, 2011, Smart Blogs on Social Media.

AACSB, "The Benefits of Blogging" BizED Magazine, 2011.

Workplace HR and Safety HR, "Blogging and Employee Productivity" March 29, 2011, Open HR resources.

Jason Hensel, "Blogging Helps Worker Productivity" April 29, 2011, PlusPoint.

"Fun Blogging on Company Time" March 13, 2011, AU Social Media Class.

"NYU Stern Releases Findings Showing Benefits of Blogging in the Workplace" March 3, 2011, Internet Business News.

"Workplace Blogging" CMU Homepage Story on Global Society and Economy.

"Blogging on Company Time? CMU-Led Research Shows Long-Term Organizational Benefits when Employees Blog at Work" March 18, 2011, CMU Heinz College Story.

Lynn Turner and Lewis Glass, "Blogging Employees Can Help Their Firms—By Dumping on Them" May, 2007, Ideablog.

"Moderate corporate self-criticism increase readership, reputation, study says" Published: Thursday, Nov. 17, 2011 3:51 p.m. MST, Desert News.

"Surprise! Going Negative Might Be Good for Business Blogging" by Steve Woods., November 16, 2011, Technorati Media.

"Negative Blog Posts Can Have Positive Impact on Business" November 16, 2011 09:01 AM Eastern Time, Business Wire. Yahoo Finance, Reuters, finanznachrichten, streetinsider, Dailyfinance, Boston.com, Investorpoint.com,

"Even negative blogs have a positive impact" Nov 16, 2011, <http://www.adigaskell.org>.

"The Positive Side of Negative Employee Blogs" November 17, 2011 by Jeanette Mulvey, Business News Daily.

"Negative Employees can be good for business" November 17, 2011, Yahoo News.

Allan Alter, "The Secret of Open source Project Success" April 9, 2008, CIO Insights.

"Reducing Crowdsourcing Clutter" February 29, 2012, Peter Llyod, Ideaconnection.com.

"3 Ways to Improve the Ideas You Get from Crowdsourcing" February 13, 2012, Hazel McHugh, Getsponge.com.

"Carnegie Mellon Defends Crowdsourcing" February 2, 2012, Eric Mack, Crowdsourcing.org.

"Listen Up! Two Way Communication Key Lesson in Crowdsourcing" February 6, 2012 Kathy Gill, Wired Pen.

"Studies Refutes Three Major Criticisms of Crowdsourcing" February 3, 2012, Paul A. Ideaconnection.com.

"Crowdsourcing Can Generate Valuable Ideas for Firms" Crowdsourcing.org, Techjournalcouth.com, Niuzer.com, Silobreaker.com, Scoop.it, Congoo.com.

"New CMU Study Shows How Firms Can Successfully Crowdfund High Potential New Product Ideas From Consumers" February 2, 2012, Yahoo Finance, prnewswire, World News, Crowdsourcing.org,

"Will "Expendables 3" Pre-release Piracy Hurt Box-Office Revenue?" July 30, 2014, Todd Spangler, Variety.

"Copyright Piracy and the Entertainment Industry: Is the Affect Massive or Negligible?" Stephen Carlisle, August 13, 2014, Nova Southwestern University.

"The Expendables 3 Leak and the Financial Effect of Pre-Release Piracy" July 28. 2014, FF.org.

"How Much Will the Piracy of Expendables 3 Cost Lionsgate?" August 1, 2014, The Warp.

RESEARCH GRANTS AND CONTRACTS

Awarded to Date

Uncovering the Source of Machine Bias
Block Center Grant
2019-2020 (\$35000)
Role: Co-lead
(with Yan Huang)

Ripple University Blockchain Research Initiative
2019-2020 (\$1025000)
Role: Co-lead
(with Ramayya Krishnan)

CMU Coin: A University Wide Initiative for Establishing a Cryptocurrency Testbed for
Teseach and Education at CMU
2018-2020 (Various grants)
Role: Co-lead
(with Ramayya Krishnan)

Photo Feature X is Worth Y Dollars: Investigating the Economic Impact of Images in E-
Commerce Via Deep Learning
Adobe Data Science Research Award
2017 (\$50000)
Role: Principal Co-Investigator

A Structured Analysis of Unstructured Big Data Using Cloud Computing
Carnegie Bosch Institute
2013-14 (\$7250)
Role: Principal Co-Investigator

Crowdsourcing New Product Ideas
Center for Future of Work
2011-2012 (\$25000)
Role: Principal Co-Investigator

Social Networks and Knowledge Transfer
Center for Future of Work
2010-2011 (\$10000)
Role: Principal Investigator

Developer Learning Dynamics in Open Source Software Projects
**Center for Organizational Learning, Innovation, and Performance, Carnegie Mellon
University**
2008-09 (\$5000)
Role: Principal Investigator

(with Yong Tan, Foster School of Business, University of Washington, and Nara Youn, Tippie School of Business, University of Iowa)

Determinants of Open Source Software Licensing Choice: A Social Influence Perspective
Berkman Faculty Development

2009-10 (\$4000)

Role: Principal Investigator

PROFESSIONAL ACTIVITIES

Invited talks at Conference/Symposium

Keynote Tutorial in Operations Research, Deep Learning in Computer Vision: Methods, Fairness, Interpretation and Causation, 2019

Keynote, Unfair and Opaque Algorithms, Family Weekend, Carnegie Mellon University, 2019.

Keynote, Emerging Research Topics in Technology and Operations, Indiana University, 2019.

Keynote, Algorithmic Bias, at the Machine Learning and Marketing Conference, 2019.

Keynote, Crowds, Lending, Machine and Bias, at the Digital Marketing Conference, 2019.

Keynote, Deep Learning and AI in Business, at the Informs Organization Science Conference, 2018.

Keynote, Image Optimization at Airbnb, at AI and Business Conference at University of Florida, 2018.

Keynote, AI in Business, Opportunities and Challenges, at the Technology and Business Industry Forum, 2017, Ross School of Business, University of Michigan.

Tutorial on Deep Learning at Informs/CIST 2017.

Seminars at other academic institutions

Research Seminar at the Ross School of Business, University of Michigan, February, 2020.

Research Seminar at the Krannert School of Management, Purdue University, March, 2019.

Research Seminar at the Questrom school of Business, Boston University, January, 2019.

Deep Learning Tutorial at Institute for Insight, Georgia State University, February, 2018.

Research Seminar at the Robinson College of Business, Georgia State University, February, 2018.

Research Seminar at the Wharton School, University of Pennsylvania, April, 2017.
 Research Seminar at the McCombs School, University of Minnesota, April, 2017.
 Research Seminar at Carlson School of Management, University of Minnesota, March, 2017.
 Research Seminar at Seoul National University, Seoul, South Korea, May 2016.
 Research Seminar at Seoul National University, Seoul, South Korea, May 2015.
 Research Seminar at Stern School of Business, New York University, NY, November 2014.
 Research Seminar at Foster School of Business, University of Washington, Seattle, November 2014.
 Research Seminar at Fox School of Business, Temple University, Philadelphia November 2013.
 Research Seminar at Scheller College of Business, Georgia Tech University, Atlanta, November 2013.
 Research Seminar at Broad College of Business, Michigan State University, Lansing, September 2013.
 Research Seminar at Smith School of Business, University of Maryland, College Park, November 2011.
 Research Seminar at Krannert School of Business, Purdue University, March 2011.
 Research Seminar at Carlson School of Management, University of Minnesota, Minneapolis, (October 24, 2008).
 Research Seminar at Decisions, Katz School of Business, University of Pittsburgh, Pittsburgh, Pennsylvania, (November 13, 2009).

Awards, Prizes, Honors

Distinguished Fellow, INFORMS Information Systems Society, 2019
 Best Student Paper Award at *Conference of Information Systems and Technology*, 2019
 Runner up to *Best Published Paper* for 2018 for *Information Systems Research*
 Finalist, 2019 TIMES Best Published Paper Award at *Management Science*
 Poet and Quant's *Top 50 Undergraduate Professors*.
 Best Student Paper Award at *Conference of Information Systems and Technology*, 2017
 Service Award at *Information Systems Research*, 2017
 Adobe Data Science Research Award, 2017
 Finalist, Best Published Paper Award at *Management Science* in Information Systems
 Discipline, 2013-16
 Best Student Paper Award at *Conference of Information Systems and Technology*, 2016
 The Sandy Slaughter Early Career Award, 2015
 Carnegie Bosch Institute Chair, AY 2016-
 Carnegie Bosch Institute Junior Chair, AY 2015-16
 Carnegie Bosch Institute Junior Chair, AY 2012-15
 Faculty Giving Chair, AY 2011-2012
 Runner up to *Best Published Paper* for 2011 for *Information Systems Research*
 America's Winner of Google Online Marketing Challenge, 2009-10.
 Awarded \$5000 research grant by the Center for organizational learning, innovation and
 performance, Carnegie Mellon University, 2008.
 Awarded Dean's Achievement Award 2005-2006.
 Participant at Doctoral Consortium, Center for International Business Education and
 Research, Seattle, Washington, 2005.

Awarded University of Washington Graduate School Top Scholar Award (2004-2005)
Foster Endowed Fellowship dissertation funding, 2007 and 2008.
Nominated for University of Washington Business School Instructor of the Quarter award,
Winter 2007.
Best Paper Nomination for AMCIS, Tampa, Florida, 2003.

EDITORIAL ROLES

Senior Editor:

Information Systems Research, 2018-

Associate Editor:

Management Science, (Information Systems Track 2015- 2019, Entrepreneurship and
Innovation Track 2018-)

Information Systems Research, 2013-2017

Special Issue Associate Editor

Information Systems Research (special issue on *Ubiquitous IT and Digital
Vulnerabilities*)

Information Systems Research (special issue on *Information, Technology, and the
Changing Nature of Work 2013-14*)

MIS Quarterly (special issue on *Information Technology and Innovation 2014-15*)

International Conference on Information Systems, 2015

International Conference on Information Systems, 2014

International Conference on Information Systems, 2013

International Conference on Information Systems, 2012

International Conference on Information Systems, 2011

Ad Hoc Referee for Management Science, Marketing Science, Journal of marketing
Research, Review of Economics and Statistics, Information Systems Research, Management
Information Systems Quarterly, Journal of Management Information Systems, ACM
Transactions on Software Engineering and Methodology, International Conference on
Information Systems., Conference on Information Systems and Technology, Workshop on
Information Systems and Technology.

SERVICE

Tepper School of Business

Coordinator, Information Systems Seminar Series (2008-09)

Coordinator, Information Systems Seminar Series (2009-10)

Coordinator, Information Systems Seminar Series (2010-11)

Coordinator, Information Systems Seminar Series (2011-12)

Coordinator, Information Systems Seminar Series (2012-13)

Coordinator, Information Systems Seminar Series (2013-14)

Coordinator, Information Systems Seminar Series (2014-15)

Coordinator, Business Technology Seminar Series (2015-16)

Member, Information Systems Faculty Search Committee (2008-09)
Member, Information Systems Faculty Search Committee (2010-11)
Undergraduate Coordinator for Information Systems (2010-12)
Member, Information Systems Faculty Search Committee (2011-12)
Member, Business Analytics Faculty Search Committee (2013-14)
Member, Undergraduate Curriculum Review Committee (2013-14)
Member, Business Analytics Faculty Search Committee (2014-15)
Member, Masters Education Affairs Committee (2013-15)
Member, PhD Affairs Committee (2014-)
Member, Berkman Faculty Career Development Fund Committee (2012-14)
Member, Carnegie Mellon University Non-Tenure Committee (2013-16)
Chair, Business Technology/Business Analytics Faculty Search Committee (2016-17)
Member, Dean Performance Evaluation Committee (2016)
Member, Strategic Planning for Research Committee (2016-17)
Member, Master of Science in Business Analytics Curriculum Committee (2016-2017)
Member, Master of Science in Business Analytics Program Planning (2017-)
Chair, Business Technology Faculty Search Committee (2017-18)
Member, Tepper Website Committee (2017- 2019)
Chair, Business Technology Faculty Search Committee (2019-20)

Conference Chair

Inform's Annual Meeting, Information Systems Cluster Chair, 2011, Charlotte, NC.
Conference on Information Systems and Technology, 2012, Phoenix, Arizona.
Workshop on Information Systems and Economics, 2012, Orlando, Florida.
Structural Modeling Applications of Research on Technology, 2014, Pittsburgh, PA.
Structural Modeling Applications of Research on Technology, 2015, Pittsburgh, PA.
Inform's Annual Meeting, Information Systems Cluster Chair, 2015, Philadelphia, PA.
Structural Modeling Applications of Research on Technology, 2017, Seattle, WA.

Conference Program Committee Member

Conference on Information Systems and Technology, 2009, San Diego, California.
Conference on Information Systems and Technology, 2010, Austin, Texas.
Conference on Information Systems and Technology, 2011, Charlotte, NC.
Conference on Information Systems and Technology, 2012, Phoenix, Arizona.
ACM Conference on Electronic Commerce, 2009, Stanford, California.
ACM Conference on Electronic Commerce, 2011, San Jose, California.
ACM Conference on Electronic Commerce, 2012, Valencia, Spain.

OTHER EDUCATIONAL CONTRIBUTIONS (at CARNEGIE MELLON)

Courses Taught

45-885 & 46-885 Exploring and Visualizing Data (M2-18, E4-19) (new course)
45-828 Fintech (A4-18, M2-18) (new course, co-teaching with Bryan Routledge)

45-882 Digital Marketing and Social Media Strategy (A4-12, A4-13, E3-13, A4-14, A4-15, A4-16, A3-17, E3-17, A1-17, M1-17, E1-17, A2-18, E2-18) (new course)

45-877 Strategic Uses of Information Technology (A3-10, M3-10, A4-11, M4-10, E5-11, M3-12, M4-12)

(Significantly redesigned)

70-453 System Analysis and Design (SP-08, SP-09)

70-455 Information Resource Management (SP-08, SP-09, SP-10)

47-951 Seminar on Social Networks Analysis (A1-09, A1-10, A2-15) (new course)

47-953 Seminar on Estimating Structural Models (A2 12, A2 14, A3 17, A4 19) (new course)

70-443 Digital Marketing and Social Media Strategy (SP 12-16, Fall-16) (new course)

70-339 IT for Finance (A4-12-13, SP 14-16, Fall-16) (new course)