

# Edward McFowland III

Carlson School of Management  
University of Minnesota  
321 19th Ave. S., Room 3-368  
Minneapolis, MN, 55455

Phone: (612) 624-6872  
Fax: (612) 626-1316  
E-mail: emcfowla@umn.edu

## Academic Positions

- 2015 - Present**     **University of Minnesota**  
*Assistant Professor*  
Department of Information and Decision Sciences  
Carlson School of Management
- 2017 - Present**     *Faculty*  
Data Science  
College of Science and Engineering
- 2018 - Present**     *Affiliated Faculty*  
Department of Computer Science and Engineering  
College of Science and Engineering
- 2019 - Present**     *Graduate Faculty*  
Division of Biostatistics  
School of Public Health

## Education

- 2010 - 2015**     **Carnegie Mellon University** (Heinz College)  
*Ph.D. in Information Systems and Management*  
*Dissertation Title:* Efficient Methods for Anomalous Pattern Detection and Discovery  
*Dissertation Committee:* Daniel B. Neill (Chair), Cosma R. Shalizi, Jeff Schneider, Amelia Haviland
- 2012 - 2014**     **Carnegie Mellon University** (School of Computer Science)  
*M.S. in Machine Learning*  
*Thesis Title:* Discovering Novel Anomalous Patterns in General Data  
*Thesis Advisor:* Daniel B. Neill
- 2010 - 2013**     **Carnegie Mellon University** (Heinz College)  
*M.Phil in Public Policy*  
*Focus:* Scalable Machine Learning and Pattern Detection for the Public Good  
*Advisor:* Daniel B. Neill
- 2008-2009**     **Carnegie Mellon University** (Heinz College)  
*Masters of Information Systems (with Highest Distinction)*  
*Focus:* Large-Scale Data Analytics
- 2005-2009**     **Carnegie Mellon University** (Dietrich College)  
*Bachelors of Science in Information Systems (with University Honors)*  
*Concentration:* Statistics and Data Mining

## Academic Honors and Awards

- Adobe Research Award, 2018.
- Facebook Faculty Research Award, 2018.
- Best Paper Award (Runner-Up), INFORMS Workshop on Data Science, 2018
- Adobe Faculty Research Award, 2017.
- Best Paper Award, *Journal of Computational and Graphical Statistics*, 2016
  - Invited session at the 45th Symposium on the Interface of Computing Science and Statistics by the journal's editor in chief.
- William W. Cooper Doctoral Dissertation Award, Carnegie Mellon University, 2015
- National Science Foundation Graduate Research Fellowship, 2011-2015.
- AT&T Labs Fellowship, 2011-2014.
- Data Science for Social Good Fellowship, University of Chicago, 2013.
- Suresh Konda Award, Carnegie Mellon University, 2012.
  - For Most Outstanding First Research Paper
- Carnegie Mellon University Doctoral Fellowship, 2010-2015.

## Industry Experience

- Summer 2011**    **AT&T Labs Research** (Florham Park, NJ)  
*Data Mining Research Staff (Intern)*
- Summer 2008**    **The Boeing Company** (Bellevue, WA)  
*Data Mining Research and Development (Intern)*
- Summer 2007**    **The Boeing Company** (Saint Louis, MO)  
*Systems Architect (Intern)*
- Summer 2006**    **The Boeing Company** (Saint Louis, MO)  
*Application Developer (Intern)*

## Journal Articles

1. S. Speakman, S. Somanchi, E. McFowland III, and D. B. Neill. Penalized fast subset scanning. *Journal of Computational and Graphical Statistics*, 25(2): 382-404, 2016. **Selected for “Best of JCGS” invited session by the journal’s editor in chief.**
2. S. Speakman, E. McFowland III, and D. B. Neill. Scalable detection of anomalous patterns with connectivity constraints. *Journal of Computational and Graphical Statistics*, 24(4): 1014-1033, 2015.
3. E. McFowland III, S. Speakman, and D. B. Neill. Fast generalized subset scan for anomalous pattern detection. *Journal of Machine Learning Research*, 14: 1533-1561, 2013.
4. D. B. Neill, E. McFowland III, and H. Zheng. Fast subset scan for multivariate event detection. *Statistics in Medicine*, 32: 2185-2208, 2013.

## Conference Proceedings

1. W. Herlands, E. McFowland III, A. G. Wilson, D. B. Neill. Automated Local Regression Discontinuity Design Discovery. *Proc 24th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, 1512-1520, 2018.
2. W. Herlands, E. McFowland III, A. G. Wilson, D. B. Neill. Gaussian process subset scanning for anomalous pattern detection in non-iid data. *Proc 21st International Conference on Artificial Intelligence and Statistics*, PMLR 84: 425-434, 2018.

## Working Papers

1. C. R. Shalizi and E. McFowland III. Estimating Causal Peer Influence in Homophilous Social Networks by Inferring Latent Locations. *Invited for 2nd Round Revision: Journal of the American Statistical Association (Theory and Methods)*.
2. E. McFowland III, S. Gangarapu, R. Bapna, T. Sun. A Prescriptive Analytics Framework for Optimal Policy Deployment using Heterogeneous Treatment Effects. *Invited for 2nd Round Revision: Management Information Systems Quarterly*.
3. E. McFowland III, S. Somanchi, D. B. Neill. Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection. *Under Review: Journal of the Royal Statistical Society (Series B: Statistical Methodology)*.
4. M. Yang, E. McFowland III, G. Burtch, and G. Adomavicius. Achieving Reliable Causal Inference with Data-Mined Variables: A Random Forest Approach to the Measurement Error Problem. *Under Review: Proceedings of the National Academy of Science*.
5. L. Brandimarte, E. McFowland III, S. Somanchi, and U. Ananthakrishnan. Does Government Surveillance Give Twitter the Chills? *In Preparation: Management Science*.
6. E. McFowland III, G. Burtch, B. Danaher, and M. D. Smith. Not All Piracy is Created Equal. *In Preparation: Marketing Science*.
7. E. McFowland III and D. B. Neill. Toward Automated Discovery of Novel Anomalous Patterns.
8. S. Somanchi, E. McFowland III, and D. B. Neill. Detecting Anomalous Patterns of Care using Health Insurance Claims.

## Journal Abstracts

1. S. Speakman, E. McFowland III, S. Somanchi, and D. B. Neill. Scalable detection of irregular disease clusters using soft compactness constraints. *Emerging Health Threats Journal* 4: 11121, 2011.
2. D. B. Neill, E. McFowland III, and H. Zheng. Fast subset scan for multivariate spatial biosurveillance. *Emerging Health Threats Journal*, 4: s42, 2011.

## Book Chapters

1. S. Speakman, S. Somanchi, E. McFowland III, and D. B. Neill. Disease surveillance, case study. In R. Alhajj and J. Rokne, eds., *Encyclopedia of Social Network Analysis and Mining*, 380-385, 2014.

## Papers in Workshops and Conference Programs

1. "A Prescriptive Analytics Framework for Optimal Policy Deployment using Heterogeneous Treatment Effects," *Workshop on Information Systems and Economics*, San Francisco, California, December 2018. (Co-authored with Sandeep Gangarapu, Ravi Bapna, and Tianshu Sun)
2. "Using Data-Mined Variables in Causal Inference Tasks: A Random Forest Approach to the Measurement Error Problem," *INFORMS Workshop on Data Science*, Phoenix, Arizona, November 2018. **Best Paper Award (Runner-Up)**. (Co-authored with Mochen Yang, Gordon Burtch, and Gediminas Adomavicius).
3. "Does Government Surveillance Give Twitter the Chills?," *The Conference on Digital Experimentation*, Boston, Massachusetts, October 2018. (Co-authored with Laura Brandimarte, Sriram Somanchi, and Uttara Ananthkrishnan).
4. "Using Data-Mined Variables in Causal Inference Tasks: A Random Forest Approach to the Measurement Error Problem," *The Conference on Digital Experimentation*, Boston, Massachusetts, October 2018. (Co-authored with Mochen Yang, Gordon Burtch, and Gediminas Adomavicius).
5. "Automated Local Regression Discontinuity Design Discovery," *Proc 24th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, London, England, August 2018. (Co-authored with William Herlands, Andrew G. Wilson, and Daniel B. Neill).
6. "Not All Piracy is Created Equal," *Statistical Conference in E-Commerce Research*, Rotterdam, Netherlands, June 2018. (Co-authored with Gordon Burtch and Michael D. Smith).
7. "Gaussian process subset scanning for anomalous pattern detection in non-iid data," *Proc 21st International Conference on Artificial Intelligence and Statistics*, Lanzarote, Canary Islands, April 2018. (Co-authored with William Herlands, Andrew G. Wilson, and Daniel B. Neill).
8. "Not All Piracy is Created Equal," *Workshop on Information Systems and Economics*, Seoul, Korea, December 2017. (Co-authored with Gordon Burtch, and Michael D. Smith).
9. "Does Government Surveillance Give Twitter the Chills?," *Workshop on Information Systems and Economics*, Seoul, Korea, December 2017. (Co-authored with Laura Brandimarte, Sriram Somanchi, and Uttara Ananthkrishnan).
10. "Detecting Anomalous Patterns of Care using Health Insurance Claims," *Workshop on Information Technologies and Systems*, Seoul, Korea, December 2017. (Co-authored with Sriram Somanchi and Daniel B. Neill).
11. "A Prescriptive Analytics Framework for Optimal Policy Deployment using Heterogeneous Treatment Effects," *The Conference on Digital Experimentation*, Boston, Massachusetts, October 2017. (Co-authored with Sandeep Gangarapu, Ravi Bapna, and Tianshu Sun).
12. "Detecting Anomalous Patterns of Care using Health Insurance Claims," *Conference on Information Systems and Technology*, Houston, Texas, October 2017. (Co-authored with Sriram Somanchi and Daniel B. Neill).
13. "Estimating Causal Peer Influence in Homophilous Social Networks by Inferring Latent Locations," *Conference on Information Systems and Technology*, Houston, Texas, October 2017. (Co-authored with Cosma R. Shalizi).
14. "Does Government Surveillance Give Twitter the Chills?," *Conference on Information Systems and Technology*, Houston, Texas, October 2017. (Co-authored with Laura Brandimarte, Sriram Somanchi, and Uttara Ananthkrishnan).
15. "Detecting Anomalous Patterns of Care using Health Insurance Claims," *INFORMS Workshop on Data Science*, Houston, Texas, October 2017. (Co-authored with Sriram Somanchi and Daniel B. Neill).

16. "Estimating Causal Peer Influence in Homophilous Social Networks by Inferring Latent Locations," *INFORMS Workshop on Data Science*, Houston, Texas, October 2017. (Co-authored with Cosma R. Shalizi).
17. "Does Government Surveillance Give Twitter the Chills?," *INFORMS Annual Conference*, Houston, Texas, October 2017. (Co-authored with Laura Brandimarte, Sriram Somanchi, and Uttara Ananthkrishnan).
18. "A Prescriptive Analytics Framework for Optimal Policy Deployment using Heterogeneous Treatment Effects," *Symposium on Statistical Challenges in Electronic Commerce Research*, Ho Chi Minh City, Vietnam, June 2017. (Co-authored with Sandeep Gangarapu, Ravi Bapna, and Tianshu Sun).
19. "Does Government Surveillance Give Twitter the Chills?," *Workshop on Experimental and Behavioral Economics in Information Systems*, Atlanta, Georgia, May 2017. (Co-authored with Laura Brandimarte, Sriram Somanchi, and Uttara Ananthkrishnan).
20. "Does Government Surveillance Give Twitter the Chills?," *Workshop on Information Security and Privacy (SIGSEC)*, Dublin, Ireland, December 2016. (Co-authored with Laura Brandimarte, Sriram Somanchi, and Uttara Ananthkrishnan).
21. "Does Government Surveillance Give Twitter the Chills?," *INFORMS Annual Conference*, Nashville, Tennessee, November 2016. (Co-authored with Laura Brandimarte, Sriram Somanchi, and Uttara Ananthkrishnan).
22. "Detecting Anomalous Patterns of Care using Health Insurance Claims" *INFORMS Annual Conference*, Nashville, Tennessee, November 2016. (Co-authored with Sriram Somanchi and Daniel B. Neill).
23. "Detecting Anomalous Patterns of Care using Health Insurance Claims," *The Workshop on Health IT and Economics*, Washington, DC, October 2016. (Co-authored with Sriram Somanchi and Daniel B. Neill).
24. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," *The Conference on Digital Experimentation*, Boston, Massachusetts, October 2016. (Co-authored with Sriram Somanchi and Daniel B. Neill).
25. "Estimating Causal Peer Influence in Homophilous Social Networks by Inferring Latent Locations," *The Conference on Digital Experimentation*, Boston, Massachusetts, October 2016. (Co-authored with Cosma R. Shalizi).
26. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," *International Workshop for Applied Probability*, Toronto, Canada, June 2016. (Co-authored with Sriram Somanchi and Daniel B. Neill).
27. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection.," *Conference on Statistical Learning and Data Science*, Chapel Hill, NC, June 2016. (Co-authored with Sriram Somanchi and Daniel B. Neill).
28. "Penalized fast subset scanning," *45th Symposium on the Interface of Computing Science and Statistics* ("Best of JCGS" invited session), Morgantown, WV, June 2015. (Co-authored with Skyler Speakman, Sriram Somanchi, and Daniel B. Neill).
29. "Fast Generalized Subset Scan for Anomalous Pattern Detection," *Workshop on Data-Driven Decision Making*, The School of Operations Research and Information Engineering, Cornell University, Ithaca, NY, October 2014. (Co-authored with Skyler Speakman and Daniel B. Neill).
30. "Discovering novel anomalous patterns in general data," *Statistical Learning and Data Mining Meeting on Data Mining in Business and Industry*, Durham, NC, June 2014. (Co-authored with Daniel B. Neill).
31. "Penalized fast subset scanning," *6th International Conference on Computational and Methodological Statistics*, London, UK, December 2013. (Co-authored with Skyler Speakman, Sriram Somanchi, and Daniel B. Neill).
32. "Scalable detection of anomalous patterns with connectivity constraints," *29th Quality and Productivity Research Conference*, Long Beach, CA, June 2012. (Co-authored with Skyler Speakman and Daniel B. Neill).

33. "Fast generalized subset scan for anomalous pattern detection," *6th International Workshop on Applied Probability*, Jerusalem, Israel, June 2012. (Co-authored with Skyler Speakman and Daniel B. Neill).
34. "Efficient subset scanning with soft constraints," *6th International Workshop on Applied Probability*, Jerusalem, Israel, June 2012. (Co-authored with Skyler Speakman, Sriram Somanchi, and Daniel B. Neill).
35. "Efficient methods for anomalous pattern detection in general datasets," *INFORMS Annual Conference*, Charlotte, NC, November 2011. (Co-authored with Skyler Speakman and Daniel B. Neill).
36. "Fast multivariate subset scanning for scalable cluster detection," *Joint Statistical Meetings 2011*, Miami, FL, August 2011. (Co-authored with Skyler Speakman and Daniel B. Neill).
37. "Fast generalized subset scan for anomalous pattern detection," *INFORMS Annual Conference*, Austin, TX, November 2010. (Co-authored with Skyler Speakman, and Daniel B. Neill).
38. "Scalable detection of anomalous patterns with connectivity constraints," *INFORMS Annual Conference*, Austin, TX, November 2010. (Co-authored with Skyler Speakman and Daniel B. Neill).
39. "Fast subset scanning for multivariate event detection," *ENAR 2010 Annual Meeting*, New Orleans, LA, March 2010. (Co-authored with and Daniel B. Neill and Huanian Zheng).

### **Invited Talks and Presentations**

1. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," Statistical and Computational Challenges in Precision Medicine, Institute for Mathematics and its Applications, University of Minnesota, November 2018.
2. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," Computational Social Science Group, Microsoft Research Lab - New York City, February 2018.
3. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," Division of Biostatistics, School of Public Health, University of Minnesota, February 2018.
4. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," McCombs School of Business, University of Texas, December 2017.
5. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," Booth School of Business, University of Chicago, May 2017.
6. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," Darden School of Business, University of Virginia, February 2017.
7. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," Carlson School of Management, University of Minnesota, February 2016.
8. "Efficient Identification of Heterogeneous Treatment Effects in Randomized Experiments, via Anomalous Pattern Detection," Minnesota Population Center, University of Minnesota, January 2016.
9. "What is Data Science: An Interdisciplinary Perspective," Symposium of Health Informatics in Latin America and the Caribbean, San Juan, Puerto Rico, November 2015.
10. "Anomalous Pattern Detection: Data-Driven Knowledge Discovery," Carlson School of Management, University of Minnesota, January 2015.
11. "Anomalous Pattern Detection: Data-Driven Knowledge Discovery," Mendoza College of Business, University of Notre Dame, January 2015.

12. "Anomalous Pattern Detection: Data-Driven Knowledge Discovery," Katz Graduate School of Business, University of Pittsburgh, January 2015.
13. "Anomalous Pattern Detection: Data-Driven Knowledge Discovery," School of Information, University of Michigan, February 2015.
14. "Anomalous Pattern Detection: Data-Driven Knowledge Discovery," Yahoo! Labs, January 2015.
15. "Anomalous Pattern Detection: Data-Driven Knowledge Discovery," VCU School of Business, Virginia Commonwealth University, February 2015.
16. "Anomalous Pattern Detection: Data-Driven Knowledge Discovery," Statistics Research Department, AT&T Labs Research, February 2015.
17. "Anomalous Pattern Detection & Discovery: Converting Big Data Into Knowledge," Stern School of Business, New York University, March 2014.
18. "Anomalous Pattern Detection & Discovery: Converting Big Data Into Knowledge," Wharton School of Business, University of Pennsylvania, January 2014.
19. "Anomalous Pattern Detection & Discovery: Converting Big Data Into Knowledge," Tepper School of Business, Carnegie Mellon University, January 2014.
20. "Fast subset scanning for scalable event and pattern detection," Stony Brook University, May 2013.

## Teaching

University of Minnesota

- MSBA 6140 - Exploratory Data Analysis and Visualization - Fall (2016-2018).
- MSBA 6510 - Carlson Analytics Lab Experiential Learning - Spring (2016-2018).
- IDSC 3101 - Introduction to Programming - Spring 2016.
- MSBA 6120 - Introduction to Statistics for Data Scientists - Spring 2016.

## Grant Funding

- Investigator

External Agency: Adobe

Project Title: BiGAN Anomalous Pattern Detection for Bots Detection, 2018.

Amount: \$10,000

- Co-Principal Investigator

External Agency: Facebook

Project Title: Validating Theory for Quantifying Peer Influence in Observational Data, 2018.

Amount: \$50,000

- Principal Investigator

External Agency: Adobe

Project Title: Spatial-Temporal Anomalous Pattern Detection (and A/B Testing), 2017.

Amount: \$44,000

- Principal Investigator

External Agency: Center for Financial Services Innovation

Project Title: A Framework for Efficient Detection of Financial Health Instability, 2013-2015.

Amount: \$15,000

## Conference Service

- **International Conference on Information Systems (ICIS)**, *Associate Editor (2017-2018)*.
- **INFORMS Workshop on Data Science**, *Program Committee (2017-2018)*.
- **Conference on Information Systems and Technology (CIST)**, *Program Committee (2016-2018)*.
- **Workshop on Information Systems and Economics (WISE)**, *Session Chair (2016-2018)*.
- **Workshop on Information Technology and Systems (WITS)**, *Program Committee (2016-2018)*.
- **International Conference on Artificial Intelligence and Statistics (AISTAT)**, *Referee (2016-2018)*.
- **Conference on Neural Information Processing Systems (NeurIPS)**, *Referee (2018)*.
- **International Conference on Machine Learning (ICML)**, *Referee (2018)*.

## Journal Referee

- **Information Systems and Management**  
Management Science (MS), Information Systems Research (ISR), Management Information Systems Quarterly (MISQ)
- **Statistics and Machine Learning**  
Journal of the American Statistical Association (JASA)

## Professional Memberships

- Association of Information Systems (AIS)
- INFORMS Information Systems Society (ISS)
- American Statistical Association (ASA)