

# Tyler Harris McCormick

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## Education

### COLUMBIA UNIVERSITY

Ph.D. in Statistics, with distinction, 2011  
M.Phil. in Statistics, 2010  
M.A. in Statistics, 2008  
Google Ph.D. Fellowship in Statistics  
Dissertation: Latent space models for networks using Aggregated Relational Data  
Advisor: Tian Zheng

### UNIVERSITY OF CONNECTICUT

M.S. in Statistics, 2008

### DUKE UNIVERSITY

B.A., with distinction, 2005  
Robertson Scholar

## Positions

### UNIVERSITY OF WASHINGTON

Associate Professor (with tenure), Department of Statistics, 2016-present  
Associate Professor (with tenure), Department of Sociology, 2016-present  
Senior Data Science Fellow, eScience Institute, 2014-present  
Core faculty member, Center for Statistics and the Social Sciences, 2011-present  
Faculty affiliate, Center for Studies in Demography and Ecology, 2011-present  
Assistant Professor, Department of Statistics, 2011-2016  
Assistant Professor, Department of Sociology, 2011-2016

## Publications

### Journal articles

Wang, F., McCormick, T. H., Rudin, C., and Gore, J. (2018+) Modeling recovery curves with application to Prostatectomy. *To appear, Biostatistics.*

Salter-Townshend, M. and McCormick, T. H. (2017+) Latent space models for multiview network data. *To appear, Annals of Applied Statistics.*

- Lee, W., Fosdick, B., and McCormick, T. H. (2017+) Inferring social structure from continuous-time interaction data. *Discussion paper to appear in Applied Stochastic Models in Business and Industry*.
- Clark, S., Wakefield, J, McCormick, T. H., and Ross, M. (2017+) Hyak mortality monitoring system: Innovative sampling and estimation methods *To appear, Global Health, Epidemiology and Genomics*.
- McCormick, T. H., Li, Z., Calvert, C., Crampin, A. C., Kahn, K., and Clark, S. J. (2016) Probabilistic Cause-of-death Assignment using Verbal Autopsies. *Journal of the American Statistical Association*, 111: 1036-1049.
- Baraff, A., McCormick, T. H., and Raftery, A. E. (2016) Estimating Uncertainty in Respondent-Driven Sampling Using a Tree Bootstrap Method. (2016) *Proceedings of the National Academy of Sciences (USA)*, 113: 14668-14673.
- Arseniev-Koehler, A., Lee, H., McCormick, T. H., and Moreno, M. (2016) #Proana: Pro-Eating Disorder Socialization on Twitter. *Journal of Adolescent Health*, 58: 659-64.
- McCormick, T. H. and Zheng, T. (2015) Latent surface models for networks using Aggregated Relational Data. *Journal of the American Statistical Association*, 110: 1684-1695.
- Ertekin, S., Rudin, C., and McCormick, T. H. (2015) Predicting power failures with Reactive Point Processes. *Annals of Applied Statistics*, 9: 122-144.
- Letham, B., Rudin, C., McCormick, T. H., and Madigan, D. (2015) Interpretable classifiers using rules and Bayesian analysis: Building a better stroke prediction model. *Annals of Applied Statistics*, 9: 1350-1371.
- McCormick, T. H., Lee, H., Cesare, N., Shojaie, A., and Spiro, E. (2015) Using Twitter for Demographic and Social Science Research: Tools for Data Collection. *Sociological Methods and Research*, 1-32.
- Maltiel, R., Raftery, A. E., McCormick, T. H., and Baraff, A. (2015) Estimating Population Size Using the Network Scale Up Method. *Annals of Applied Statistics*, 9: 1247-1277.
- Lee, H., McCormick, T. H., Wildeman, C., and Hicken, M. (2015) Racial inequalities in connectedness to imprisoned individuals in the United States. *Du Bois Review: Social Science Research on Race*, 12: 269-282.
- McParland, D., Gormley, I. C., McCormick, T. H., Clark, S. J., Kabudula, C. and Collison, M. (2014) Clustering South African households based on their asset status using latent variable models. *Annals of Applied Statistics*, 8: 747-776.
- McCormick, T. H., Ferrell, R., Karr, A., and Ryan, P. B. (2014) Knowledge Discovery in Output from Large-Scale Medical Analytics. *Statistical Learning & Data Mining*, 7: 404-412.

- Rudin, C., Ertekin, S., Passonneau, R., Radeva, A., Tomar, A., Xie, B., Lewis, S., Riddle, M., Pangsrivinij, D, and McCormick, T. H. Analytics for Power Grid Distribution Reliability in New York City. (2014) *Interfaces*, 44: 364-383.
- McCormick, T. H., Ruf, J., Moussa, A., Diprete, T. D., Gelman, A., Teitler, J., and Zheng, T. (2013) A practical guide to measuring social structure using indirectly observed network data. *Journal of Statistical Theory and Practice*, 7: 120-132.
- McCormick, T. H., and Zheng, T. (2012) Latent demographic profile estimation in at-risk populations. *Annals of Applied Statistics*, 6: 1795-1813.
- McCormick, T. H., Rudin, C., and Madigan, D. (2012) Bayesian hierarchical rule modeling for predicting medical conditions. *Annals of Applied Statistics*, 6: 652-668.
- McCormick, T. H., He, R., Kolaczyk, E., and Zheng, T. (2012) Surveying hard-to-reach groups through sampled respondents in a social network: A comparison of two survey strategies. *Statistics in Biosciences*, 4: 177-195.
- McCormick, T. H., Raftery, A. E., Madigan, D., and Burd, R. (2011). Dynamic logistic regression and dynamic model averaging for binary classification. *Biometrics*, 68, 23-30.
- Diprete, T. D., Gelman, A., McCormick, T. H., Teitler, J., and Zheng, T. (2011). Segregation in social networks based on acquaintanceship and trust. *American Journal of Sociology*, 116, 1234-83.
- McCormick, T. H., Salganik, M. J. and Zheng, T. (2010). How many people do you know?: Efficiently estimating personal network size. *Journal of the American Statistical Association*, 105, 59-70.

## **Conference proceedings and book chapters**

- Cesare, N., Spiro, E., Lee, H., and McCormick, T. H. (2016) Examining community policing on Twitter: Precinct use and community response. *SocInfo*, Bellevue, WA.
- Westling, T., and McCormick, T. H. Sandwich covariance estimation for Variational Inference. (2014) *NIPS Workshop on Advances in Variational Inference*.
- Young, W. M., Blumenstock J. E., Fox, E. B., and McCormick, T. H. (2014). Detecting and classifying anomalous behavior in spatiotemporal network data. *The 20th ACM Conference on Knowledge Discovery and Mining (KDD 14), Workshop on Learning About Emergencies Through Social information*, New York, NY.
- Letham B., Rudin, C., McCormick, T. H., and Madigan, D. Stroke prediction using Bayesian Decision Lists. (2014). *The 20th ACM Conference on Knowledge Discovery and Mining (KDD 14), Workshop on Data Science for Social Good*, New York, NY.

- McCormick, T. H., and Zheng, T. (2013) Network-based methods for accessing hard-to-reach populations using standard surveys. In *Hard-to-Survey Populations*. Editors K. Wolter and R. Tourangeau.
- Letham B., Rudin, C., McCormick, T. H., and Madigan, D. Building interpretable classifiers with rules using Bayesian Analysis. (2013). *Proceedings of AAI (late breaking track)*.
- Ertekin, S., Rudin, C., and McCormick, T. H., Predicting power failures with Reactive Point Processes. (2013) *Proceedings of AAI (late breaking track)*.
- McCormick, T. H., Rudin, C., and Madigan, D. (2011) Predicting Medical Conditions with Bayesian Hierarchical Rule Modeling. In *Proceedings of the 6th INFORMS Workshop on Data Mining and Health Informatics (DM-HI)*.

### **Popular press and non-reviewed proceedings**

- Helleringer, S., Noymer, A., Clark, S. J., and McCormick, T., H. Did Ebola relatively spare children? (2015) *The Lancet*, 386:1442 - 1443.
- Rudin, C., Dunson D., Irizarry, R., Ji, H., Laber, E., Leek, J., McCormick, T. H., Rose, S., Schafer, C., van der Laan, M., Wasserman, L., Xue, L., Discovery with Data: Leveraging Statistics with Computer Science to Transform Science and Society. *American Statistical Association white paper*.
- Rose, S. Dunson, D., McCormick, T. H., and Rudin C. (2014). Four high impact zones in statistical discovery with big data. *FierceBigData*.
- McCormick, T. H. (2011). Bayesian analysis of social network data. *ISBA Bulletin*, 18, 6-9.
- McCormick, T. H. and Zheng, T. (2010). A latent space representation of overdispersed relative propensity in "How many X's do you know?" data. Conference Proceedings. Joint Statistical Meetings: Vancouver, B.C.
- McCormick, T. H. and Zheng, T. (2009). Towards a unified framework for inference in Aggregated Relational Data. Conference Proceedings. Joint Statistical Meetings: Washington, D.C.
- McCormick, T. H., Ruf, J., Moussa, A., Diprete, T. D., Gelman, A., Teitler, J., and Zheng, T. (2009). Comparing two methods for predicting opinions using social structure. Conference Proceedings. Joint Statistical Meetings: Washington, D.C.
- McCormick, T. H. and Zheng, T. (2007). Adjusting for recall bias in "How many X's do you know?" surveys. Conference Proceedings. Joint Statistical Meetings: Salt Lake City, Utah.

## Sponsored Research

- 2017-2019 *ATD: Collaborative Research: Algorithms and Data for High-Frequency, Real-Time Anomaly Detection*, NSF-DMS. Total Award: \$200,000. Role: Multi-PI with Rumi Chunara (NYU).
- 2017-2018 *BD2K: Big Data to Knowledge Supplement to Population Research Training*, NIH. Total Award: \$90,000. Role: Co-PI.
- 2016-2018 *Compact Bayesian models for massive social graphs*, NSF-MMS. Total Award: \$150,000. Role: PI.
- 2016-2021 *Verbal autopsy reboot: Estimating cause of death in the developing world*, NIH/NICHD R01. Total Award: \$3.5M. Role: co-Investigator, 50% effort. Impact score: 16. Percentile score: 3.
- 2015-2020 *Estimating vital rates in the developing world: A Bayesian process modeling approach*, NIH/NICHD K01 Award. Total Award: \$610,515. Role: PI. Impact score: 13.
- 2014-2015 *Probabilistic cause of death assignment*, CSDE. Total Award: \$17,000. Role: PI. Co-PI: Sam Clark
- 2013-2015 *Patient-level predictive models using massive medical data*, Foundation for the NIH (OMOP). Total award: \$103,000. Role: PI.
- 2012-2015 *Using social media networks to identify deviant behavior*, Army Research Office. Total award: \$300,000. Role: PI. Co-PIs: Hedwig Lee (UW Sociology), Ali Shojaie (UW Biostatistics).
- 2013-2014 *Measuring attitudes towards gun control after mass shootings using Twitter*, CSDE Seed grant. Total Award: \$17,000. Role: Co-PI. Co-PIs: Hedwig Lee (UW Sociology), Ali Shojaie (UW Biostatistics).
- 2012-2013 *Bridging Social Media and Public Health: Using Twitter to Explore Social Determinants of Obesity*, UW School of Public Health Emerging Challenges Grant. Total award: \$40,000. Role: Co-PI. PI: Ali Shojaie (UW Biostatistics). Co-PI: Hedwig Lee (UW Sociology).
- 2012-2013 *Online dynamic models and model averaging via dynamic data augmentation*, Google Faculty Research Award. Total award: \$42,615. Role: PI.
- 2012-2013 *Detecting stigma in social networks*, Center for Statistics and the Social Sciences Seed Grant. Total award: \$24,959. Role: Co-PI. PI: Hedwig Lee (UW Soc).

## Honors and Awards

Joint Statistical Meetings paper award from the Section on Bayesian Statistical Science (2018)

Joint Statistical Meetings paper award from the Section on Bayesian Statistical Science (2016)

Poster award from International Conference on Computational Social Science (2016)

Poster award from the International Symposium on Business and Industrial Statistics / Conference of the ASA Section on Statistical Learning and Data Mining (2014)

ASA Statistical Learning & Data Mining Paper Award (2014)

Winner of INFORMS Data Mining Best Student Paper Competition for paper "An Interpretable Stroke Prediction Model using Rules and Bayesian Analysis." (2013)

U.S. Army Young Investigators Program (YIP) award (2012)

Young academic award, CRiSM workshop on Model Uncertainty, Warwick, U.K. (2010)

Student paper award, Statistical Learning and Data Mining Section, ASA (2010)

Columbia Applied Statistics Center summer research grant (2010)

NSF travel award, International Society for Bayesian Analysis World Meetings (2010)

Howard Levene Teaching Award, Dept. of Statistics, Columbia University (2009)

JSM Poster Award, Survey Research Methods Section, ASA (2009)

Columbia Population Research Center Seed Grant (2009)

Laha Award, Institute of Mathematical Statistics (2008)

Outstanding Student Paper (Methodology), Intl. Indian Statistical Assn. (2008)

*Phi Beta Kappa*, Duke University (2005)

*Magna Cum Laude*, Duke University (2005)

Regional Scholar, Coca-Cola Scholars Program (2001-2005)

## Invited Conference Presentations

"Estimating features of a network using a sample," Russel Sage Foundation Workshop on Computational Social Science, Palo Alto, 2017.

"Probabilistic cause of death assessment," JSM, Chicago, 2016

- “Multiresolution network models,” Newton Institute, Cambridge, UK, 2016
- “Exchangeable network regressions,” ISBA World Conference. Sardinia, 2016
- “Standard errors in exchangeable network regressions,” Statistical Learning and Data Science Meetings, Chapel Hill, NC. 2016
- “Estimating the reach of mass incarceration,” American Sociological Association Annual Meetings, Chicago, 2015.
- “Accessing hard-to-reach groups with the network scale-up method,” American Sociological Association Annual Meetings, Chicago 2015.
- “Interpretable features in continuous-time network data,” Joint Statistical Meetings, Seattle, 2015.
- “Interpretable feature creation in electronic healthcare records,” ENAR, Miami 2015.
- “Challenges and Insights with unsolicited relational data,” Population Association of America, Boston 2014.
- “Statistical models for unsolicited network data,” ASA ISBIS & SLDM Conference, Durham, NC 2014.
- “Latent space models for multiview network data,” SAMSI 2013.
- “Using Twitter for Demographic Research,” Population Association of America, New Orleans 2013.
- “Estimation in partially observed network data,” ASA SLDM Conference, Ann Arbor, MI 2013.
- Panel discussion. “Big data in the social sciences,” Population Association of America, New Orleans 2013.
- “Online Dynamic Model Averaging,” ASA SLDM Conference, Houston, TX 2012.
- “Post-Stratification and Network Sampling,” Joint Statistical Meetings, Miami 2011.
- Discussant, “Analysis and Inference for Complex Networks,” Joint Statistical Meetings, Miami 2011.
- “Estimating latent demographic profiles using Aggregated Relational Data,” International Chinese Statistical Association Meetings 2011.
- “Latent structure models for social networks using Aggregated Relational Data,” New England Statistics Symposium 2011.
- “Latent structure models for social networks using Aggregated Relational Data,” Invited poster, Joint Statistical Meetings, Vancouver 2010.

“How many people do you know?: Efficiently estimating personal network size,” Laha Award Presentation, 7th World Congress in Probability and Statistics, 2008.

“Efficient estimation of personal network size,” Annual Methodology Conference, American Sociological Association, 2008.

“Bayesian modeling for a Generalized Social Relations Model,” American Psychological Association Conference on Dyadic Data 2007.

“Markov Chain Monte-Carlo estimation of the  $p^*$  Method for social networks,” Annual Methodology Conference, American Sociological Association, 2006.

## Departmental Seminars

Duke University, Population Research Center, 2018

Princeton University, Quantitative Social Science, 2017

Columbia University, Statistics, 2017

Boston University, Statistics, 2017

Johns Hopkins University, Hopkins Population Center, 2017

Johns Hopkins University, Biostatistics, 2017

University of Illinois at Urbana-Champaign, Statistics, 2017

Rice University, Statistics, 2017

University of Virginia, Statistics, 2017

UCLA, California Center for Population Research, 2016

UC-Irvine, Statistics, 2016

Lancaster University, Mathematics & Statistics, 2016

University of Chicago Booth School, Econometrics and statistics, 2016

University of Michigan, Biostatistics, 2016

North Carolina State University, Statistics, 2016

New York University, Center for Data Science, 2016

University of Pennsylvania, Statistics, 2016

Rice University, Statistics, 2015

University of Minnesota, Statistics, 2015



Colorado State University, Statistics, 2015  
Yale University, Biostatistics, 2014  
Group Health Research, 2014  
Brigham Young University, Statistics, 2013  
University of Washington, Biostatistics  
Duke University Population Research Center, 2013  
Duke University Network Analysis Center, 2013  
Stanford University, Statistics, 2011  
University of Toronto, Statistics, 2011  
RAND Corporation, 2011  
Johns Hopkins University, Biostatistics, 2011  
University of California at Irvine, Statistics, 2011  
Carnegie-Mellon University, Statistics, 2011  
New York University, Stern School of Business, 2011  
Cornell University, Statistics, 2011  
Duke University, Statistics, 2011  
University of Chicago, Booth School of Business, 2011  
University of Notre Dame, Applied Mathematics, 2011  
University of Washington, Statistics and Sociology, 2011  
Duke Network Analysis Center, 2010  
University of Washington, CSSS, 2010

## **Contributed Presentations**

“Interpretable models for unsolicited network data,” JSM, Boston 2014.

“Community coevolution in unsolicited network data,” ISBA World Meetings, Cancun, Mexico 2014.

“Spatio-Temporal Models for Point Pattern Data with Network-Dependent Sampling,” Joint Statistical Meetings, Montreal 2013.

- “Combining link prediction with network sampling,” Joint Statistical Meetings, San Diego 2012.
- “Dynamic model averaging for binary classification,” Joint Statistical Meetings, Miami 2011.
- “Dynamic model averaging and dynamic logistic regression,” Joint Statistical Meetings-Vancouver, 2010.
- “Extracting network features through indirectly observed network data,” Statistical Modeling and Inference for Networks Conference, SuStain, University of Bristol 2010 (awarded travel support from conference committee).
- “Latent structure models for social networks using Aggregated Relational Data,” 2010 ISBA World Meetings, Benidorm, Spain (awarded travel support from conference committee).
- “Dynamic model averaging and dynamic logistic regression,” Joint Statistical Meetings-Washington, D.C. 2009.
- “Latent structure models for social networks using Aggregated Relational Data,” Statistical Methods for the Analysis of Network Data Meetings, University College Dublin 2009 (awarded travel support from conference committee).
- “How many people do you know?: Efficiently estimating personal network size,” International Chinese Statistics Association Conference 2008.
- “Estimating network size using conventional surveys,” International Indian Statistics Association Conference 2008.
- “Estimating social network size,” Joint Statistical Meetings-Salt Lake City 2007.
- “On the distribution of personal network size,” New England Statistics Symposium 2007.
- “Race and friendship in middle childhood: Analysis using the  $p^*$  Method for social networks,” Thesis Presentation for Graduation with Distinction, Duke University 2005 (supervised by Jerry Reiter).

## Poster Presentations

- “Latent covariance models with marginal priors,” ISBA 2016.
- “Probabilistic cause of death estimation,” Population Association of America 2016.
- “The network scale-up method for population size estimation,” Population Association of America 2014.
- “Interpretability in Predictive Modeling with the Bayesian List Machine,” OMOP Symposium 2013.

“Interpretability in Predictive Modeling with the Bayesian List Machine,” AAAI Late Breaking 2013.

“Predicting power failures with Reactive Point Processes,” AAAI Late Breaking 2013.

“Latent structure models for social networks using aggregated relational data,” Isaac Newton Institute, Cambridge 2010 (awarded travel support from conference committee).

“Dynamic model averaging and dynamic logistic regression,” CRiSM Model Uncertainty Workshop, University of Warwick 2010.

“Latent structure models for social networks using aggregated relational data,” Joint Statistical Meetings-Washington, D.C. 2009 (poster award winner).

“Tell me who you know, I’ll tell you who you are: using social structure to predict opinions,” Joint Statistical Meetings-Washington, D.C. 2009.

## Teaching

Case-based social statistics (undergraduate, UW)

Categorical data analysis (graduate, UW)

Quantitative methods in sociology (graduate, UW)

Applied statistics and experimental design (graduate, UW)

Introduction to statistics (undergraduate, UW/Columbia/University of Connecticut)

Teaching assistant

Graduate—Applied statistics, Spring 2010; Data mining, Fall 2009; Linear Models, Fall 2007

Undergraduate—Introduction to statistics, Spring 2003-Spring 2005 at Duke University and Spring 2008 at Columbia University

## Professional Involvement

Invited poster co-organizer (with Genevera Allen), JSM 2016.

Russel Sage Foundation panel on future of Computational Social Science, 2016

Referee service: *AISTATS*; *American Journal of Sociology*; *Annals of Statistics*; *Annals of Applied Statistics*; *Bayesian Analysis*; *Biometrika*; *Computational Statistics and Data Analysis*; *Demography*; *Demographic Research*; *Electronic Journal of Statistics*; *Field Methods*; *Journal of the American Statistical Association*; *Journal of Business and Economic Statistics*; *Journal of Computational and Graphical Statistics*; *Machine Learning Journal*; *National Institute for the Humanities*; *Population Studies*; *Social Problems*; *Sociological Methodology*; *Alfred P. Sloan Foundation*; *Statistical Analysis and Data Mining*; *Statistics, Politics, and Policy*; *Survey Methodology*, *Statistics in Medicine*.

Associate Editor, Journal of Computational and Graphical Statistics , 2015-  
Associate Editor, Computational Statistics and Data Mining, 2014-2015  
Associate Editor, Statistical Analysis and Data Mining, 2013-2015  
UNODC experts group, network-based estimates of rare crimes, 2014  
UNAIDS reference group, network-based population size estimation, 2010, 2012, 2014  
Co-PI on UW Moore/Sloan Data Science Initiative proposal  
Co-PI on UW Washington Research Foundation Data Science proposal  
Invited coauthor on American Statistical Association whitepaper on intersection between statistics and NSF priorities  
NSF/NIH review panels, 2014-2016  
Interface Foundation board member, 2012-2015  
Organizer (with Cynthia Rudin) and chair, Topic-contributed session, Recent developments in spatial/temporal modeling, JSM 2013  
Organizer (with Ali Shojaie) and chair, Topic-contributed session, Advances in methods for social and biological networks, JSM 2013  
Organizer (with Ali Shojaie) and chair, Topic-contributed session, The interface between social and biological network data, JSM 2012  
Chair, Invited session, Advances in Modeling Nontraditional Network Data, JSM 2011  
Chair, Invited session, Latent space models for networks, JSM 2010  
Seminar chair, Department of Statistics Student Seminar, Columbia University 2009-2010  
Chair, Contributed session, Statistical Learning and Data Mining Section, JSM 2009  
Organizing Committee, Minghui Yu Memorial Research Day, Columbia University 2009  
New Faculty Recruitment Committee Member, Columbia University 2009  
Organizing Committee, Conference on Doctoral Careers in Statistics, Columbia University, April 2008  
New Faculty Recruitment Committee Member, Columbia University 2008  
Organizing Committee, Mini-Symposium on Statistical Consulting, Columbia University, January 2008

Chair, Invited session “Recent Contributions to Nonparametric Methodologies in Biomedical Research” organized by Tian Zheng, International Chinese Statistical Association Symposium 2006

Professional Societies

Member, American Statistical Association

Member, International Society for Bayesian Analysis

Member, Institute of Mathematical Statistics

Member, American Sociological Association