

Joshua Goldstein

Social and Decision Analytics Laboratory
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Education

Ph.D. Statistics, Pennsylvania State University, 2015
Thesis title: *Compartmental, Spatial and Point Process Models for Infectious Diseases*.
Thesis advisor: Dr. Murali Haran

B.S. Physics and B.S. Mathematics, Lafayette College, 2007

Employment

Postdoctoral Fellow, Social & Decision Analytics Laboratory, Biocomplexity Institute of Virginia Tech, Arlington, VA, 2015 – Present.

Instructor for Stat 401 'Experimental Methods', The Pennsylvania State University, State College, PA, 2014 – 2015.

Graduate Research Assistant, The Pennsylvania State University, State College, PA, 2012 – 2015.

Teaching Assistant, The Pennsylvania State University, State College, PA, 2010 – 2013.

Research Experience on Funded Projects

Data Science for the Public Good (FY15-ongoing)

Mentored students, and led student teams over two summers as part of SDAL's Data Science for the Public Good program. These included multiple teams of undergraduate and graduate students in collaborations with the Arlington County Fire Department and Police Department, Fairfax County Department of Neighborhood and Community Services (NCS), and U.S. Army Research Institute for Behavioral and Social Science Research. Directed the process of data discovery, profiling, exploration, and statistical analysis, which led to the creation of posters for a symposium, reports, and publications. My statistical contributions include:

- Testing the impact of police programs on crime rate in Arlington using a spatiotemporal point process.
- Modeling the factors that influence response time to structure fires using Gaussian process regression.
- Using American Community Survey (ACS) data to explore mental health services for Fairfax county youth. ACS variables were aligned with high school districts using methods to generate synthetic populations.
- Overseeing the collection of external sources of statistical data and building dashboard to identify factors that may affect an Army Soldiers to stay in or leave the Army.

U.S. Army Research Institute for Social and Behavioral Research (ARI)

Towards an Integrated Data Framework for Understanding the Context of Military Environments, (FY15-FY18 with one year \$286,862 extension pending) \$1,691,337, Co-PI

Responsible for developing a Soldier attrition model based on a Bayesian survival framework. Set up a data environment in the Department of Army's data enclave in R and SQL.

ARI Early Career (FY17)

Co-Principal Investigator on a U.S. Army Research Institute for Behavioral and Social Science Research Early Career Award. Developed an agent-based model in Python that simulates dynamic social networks in a hospital, and includes cognitive theory to explore the spread of knowledge in an organization.

Individual and Team Performance, (FY17-FY22), The Social Component of The Human Dimension: Leveraging Existing DoD Data Towards Optimized Individual And Team Performance in the Army, \$3,027,401, Co-PI

Co-Principal Investigator on this award, responsible for the data development for this project in the Department of Army's data enclave and part of the statistical modeling team.

U.S. Housing and Urban Development (FY16-FY17)

Developed novel methods for generating synthetic populations in work for the U.S. Census Bureau and Department of Housing and Urban Development to assess the identifiability of records by matching data from the American Housing Survey with local sources of property and housing data, such as property tax assessment data.

Procter & Gamble (FY15-FY16)

Built Bayesian models using massive datasets to create end-to-end supply chain optimization simulations in collaboration with Procter & Gamble. Directed a team of students from the University of Cincinnati Simulation Center to implement and expand these models.

Manuscripts

Publications

Keller, S., Shipp, S., Korkmaz, G., Molfino, E., Goldstein, J., Lancaster, V., Pires, B., Higdon, D., Chen, D., and Schroeder, A. 2018. Harnessing the Power of Data to Support Community-Based Research. *Wiley Interdisciplinary Reviews: Computational Statistics* 10.3 (2018): e1426.

Park, J., Goldstein, J., Haran, M., and Ferrari, M. (2017). "An ensemble approach to predicting the impact of vaccination on rotavirus disease in Niger," *Vaccine*, 35(43), 5835-5841.

Pires, B., Goldstein, J., Molfino, E. and Ziemer, K. "Exploring Dynamic, Multi-Level Interactions within an Organization: An Agent-based Modeling Approach," *in the post-proceedings of the Computational Social Science Conference*, 19th–22nd October, 2017, Santa Fe, NM.

Pires, B., Goldstein, J., Higdon, D., Reese, S., Sabin, P., Korkmaz, G., Ba, S., Hamall, K., Koehler, A., Shipp, S., and Keller, S. (2017). "A Bayesian Simulation Approach for Supply Chain Synchronization", *in the post-proceedings of the 2017 Winter Simulation Conference (WSC)*, 3rd – 6th December, Las Vegas, NV.

Goldstein, J., Haran, M., Simeonov, I., Fricks, J., and Chiaromonte, F. (2015). "An attraction-repulsion point process model for respiratory syncytial virus infections," *Biometrics* 71:376-86

Technical Reports

Goldstein, J., Molfino, E., Keller, S., Higdon, D. (2016). "Uniqueness Assessment for American Housing Survey Records: a Pseudouniverse Approach," Social and Decision Analytics Laboratory in the Biocomplexity Institute of Virginia Tech.

Papers in Preparation

Goldstein, J., Park, J., Haran, M., Bjørnstad, O. and Liebhold, A. "Quantifying spatio-temporal variation of invasion spread." *submitted for publication in Methods in Ecology and Evolution*

Goldstein, J., Korkmaz, G., and Tyner, S. "The use of multiple data sources to predict residential smoke detector need."

Goldstein, J., Molfino, E., Keller, S., Buckholtz, S., Higdon, D. "Constructing a synthetic population to assess uniqueness of publicly released records."

Arnsbarger, M., Goldstein, J., and Korkmaz, G. "Modeling response time for structure fires."

Conferences

Goldstein, J. and Higdon, D., 2018. "Redistributing Data and Estimates Across Geographies using Synthetic Populations." *Presentation at Joint Statistical Meetings (JSM)*, 28th July – 2nd August, Vancouver, CA.

Goldstein, J., Higdon, D., Pires, B., Keller, S., Shipp, S., and Lancaster, V., 2018. "Leveraging Access to and Use of Department of Defense Data: A Case Study of Unraveling Military Attrition Through New Approaches to DoD Data Integration." *Presentation at the FCSM Research and Policy Conference*, 7th – 9th March, Washington, DC.

Goldstein, J. and Pires, B., 2017, "Exploring Dynamic, Multi-level Interactions within an Organization: An Agent-based Modeling Approach." *Presentation at the Military Operations Research Society (MORS) Symposium*, 19th – 22nd June, West Point, NY.

Goldstein, J., Pires, B., Higdon, D., Korkmaz, G., Keller, S., Shipp, S., Hamall, K., and Koehler, A., 2016, "A Bayesian Simulation Approach for Supply Chain Synchronization." *Poster presented at the Winter Simulation Conference (WSC)*, 11th – 14th December, Arlington, VA.

Goldstein, J., 2015, "Spatial local gradient models of biological invasions and epidemics." *Presentation at the RAPIDD workshop on Gravity Models, Disease Spread and Spatial Scales*, 6th – 9th September, Cambridge, UK.

Goldstein, J., 2015, "Modeling and inference for rotavirus dynamics in Niger." *Presentation at the Joint Statistical Meetings (JSM)*, 8th – 13th August, Seattle, WA.

Goldstein, J., 2015, "Modeling and inference for rotavirus dynamics in Niger." *Presentation at East North American Region International Biometric Society Conference (ENAR)*, 15th – 18th March, Miami, FL.

Goldstein, J. 2014, "An attraction-repulsion point process model for RSV infections." *Winner of student poster competition at Graybill/ENVR Conference on Modern Statistical Methods in Ecology*, 7th – 10th September, Fort Collins, CO.

Goldstein, J. 2014, "An attraction-repulsion point process model for RSV infections." *Poster presented at Joint Statistical Meetings (JSM)*, 6th – 8th August, Boston, MA.

Goldstein, J., 2012, "An attraction-repulsion point process model for RSV infections." *Poster presented at ENVR workshop on Environmetrics*, 3rd – 5th October, Raleigh, NC.