Isaac Lavine

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Education

PhD in Statistical Science *Expected* May 2020
Duke University, Durham, NC
Advisor: Mike West

B.A. in Mathematics, B.S. in Chemical Engineering May 2014
Lafayette College, Easton, PA

Professional Experience

Machine Learning and Relevance Intern May 2018 – August 2018
LinkedIn | San Jose, CA
Supervisors: Shaunak Chatterjee, PhD and Kinjal Basu, PhD
- Contributed to the ranking algorithm for content in the LinkedIn Feed
- Learned Spark and Scala to fit predictive models for user clicks, responses, and impressions
- Created a multi-objective optimization strategy for distributing user attention, implemented in R

Data + Project Manager May 2017 – August 2017
Duke Information Initiative | Durham, NC
Supervisor: Rachel Richesson, PhD, MPH
- Managed a team of masters and undergraduate students exploring disease classification systems to quantify and visualize the prevalence of rare diseases at Duke Hospital

Business Intelligence and Analytics Consultant July 2014 – September 2015
Thorogood Associates | Philadelphia, PA
Supervisor: Corey Hulse
- Provided business insights for a global packaged goods company using technologies such as Tableau, R, and SQL Server
- Implemented dynamic linear models in R to model time series of sales
- Presented in marketing and training events for a variety of clients

Research Experience

Bayesian Forecasting and Decision Analysis January 2019 – Present
84.51 Research Assistant
Advisor: Mike West, PhD
- Forecast product demand with novel Bayesian models for count-valued time series
- Researched computationally efficient methods to share information across related time series
- Created an open-source Python package for Bayesian time series modeling

Robust Latent Factor Analysis August 2018 – June 2019
NIH Research Assistant
Advisor: Amy Herring, PhD
- Developed robust dimension reduction strategies in Bayesian factor models

- Designed models to identify consistent risk factors in studies of chemical exposures
- Explored broadly applicable techniques for robust estimation and prediction

Deep Learning August 2017 – May 2018
Independent Study
Advisor: Joseph Lucas, PhD
- Built a convolutional neural net to predict mortality risk for patients with pulmonary hypertension at Duke Hospital
- Derived model features from diagnosis codes, patient medications, and previous hospital visits
- Presented relevant research papers on deep learning for 2 semesters of independent study

Dynamic Forecasting August 2016 – May 2018
SAMSI Optimization Research Assistant
Advisor: Mike West, PhD
- Designed an adaptive variable selection strategy for sequential prediction in Bayesian dynamic models
- Proposed novel ideas from Bayesian decision theory to combine goal-focused metrics, such as multiple step-ahead forecasting, with scalable computational strategies
- Applied the strategy to long-term macroeconomic forecasting

Semiconductor Simulation June 2012 – May 2014
EXCEL Research Scholar and Honors Thesis student
Advisor: Joshua Levinson, PhD
- Developed a predictive numerical simulation of passivation processes in optoelectronic semiconductor materials
- Implemented a custom finite difference scheme in MATLAB for numerically solving systems of partial differential equations to improve simulation accuracy and robustness

Relevant Coursework

Deep Learning – Deep Learning Independent Study (2 semesters), Deep Learning for Coders (online course), Neural Networks and Deep Learning (textbook)
Statistical Forecasting – Time Series and Dynamic Models, Bayesian Forecasting
Programming – Statistical Computing (Python), Numerical Optimization

Leadership

Graduate Consultative Committee: Elected leadership position within Duke Statistical Science - Represented PhD Students to the department, and organized social and academic events
Teaching Assistant: Introduction to Bayesian Statistics (STA 601), Hierarchical Models (STA 610), Linear Models (STA 721), Probability and Statistical Models (STA 831)
Toastmasters: A professional club to develop public speaking and leadership skills

Software Skills

Software: pybats, a Python package for Bayesian dynamic modeling
Programming Languages: Python, R, MATLAB. Basic SQL, C++, and Scala. Bash shell scripting
Software Experience: Spark, Tableau Desktop and Server, Qlikview and Qliksense

Publications

Lavine, I., Cron, A., and West, M. "Analytic Inference and Forecasting in Count Time Series." 2019. *Technical Report, Department of Statistical Science, Duke University*.

Roy, A., **Lavine, I**., Herring, A., and Dunson D. "Perturbed Factor Analysis: Improving generalizability across studies." 2019. *Submitted for publication*. arXiv:1910.03021.

Lavine, I., Lindon, M., and West, M. 2019. "Adaptive Variable Selection for Sequential Prediction in Dynamic Models." *Submitted for publication*. arXiv: 1906.06580.

Klosterman, S.T., Hufkens, K., Grey, J.M., Melaas, E., Sonnentag, O., **Lavine**, **I.**, Mitchell, L., Norman, R., Friedl, M.A., and Richardson, A.D. "Evaluating remote sensing of deciduous forest phenology at multiple spatial scales using PhenoCam imagery." 2014. *Biogeosciences, 11, 4305-4320.*

Lavine, M., Brothers, R.J., Lohmann, K.J., and **Lavine, I**. "Sea Turtles: A Case of Animal Magnetism." 2016. *CHANCE Magazine*.

Lavine, I. and Levinson, J.A. "Modeling and Simulation of Hydrogen Passivation in Semiconductor Photonic Materials**.**" 2014. *Undergraduate Honors Thesis*, Lafayette College Department of Chemical Engineering.

Conference Presentations

Joint Statistical Meetings (JSM)   July 2019
Adaptive Variable Selection for Sequential Prediction in Dynamic Models

SAMSI Graduate Fellows Poster Session   May 2017
Adaptive Variable Selection for Sequential Prediction in Dynamic Models

American Chemical Society (ACS)   March 2014
Modeling and simulation of hydrogen diffusion and reaction in semiconductor photonic materials

Academic Honors

BEST Award (2017): BEST Foundation award to support Bayesian research in financial time series
National Science Foundation: Honorable Mention for the Graduate Research Fellowship
Luther F. Witmer Prize (2014): Lafayette College Chemical Engineering senior award