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David Patrick Lundquist

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Professional Website
Citizenship: USA

Education

PhD **University of Illinois, Urbana-Champaign**, Statistics

- GPA: 3.79/4.0 (Transcript, University Webpage)
- **Research:** stochastic processes, time series econometrics, supervised learning, reinforcement learning, point forecasts, density and quantile forecasts, forecast combination, model averaging, econometric analysis of shocks, panel data, volatility modeling, recession forecasting using ML
- **Coursework:**
  - GLMs incl. linear, logistic, and Poisson regression; fixed, random, mixed effects
  - supervised learning: LASSO / Ridge, random forest, boosted trees, SVM
  - unsupervised learning: t-SNE, UMAP, K-means/medoids, hierarchical clustering e.g. HDBSCAN, Gaussian mixtures, self-organizing maps, nonnegative matrix factorization
  - Deep Learning: PyTorch, TensorFlow, Keras, JAX
  - Optimization, cts and discrete, gradient descent, mixed integer programming
  - Natural Language Processing (NLP) including Word2Vec, Doc2Vec, LDA, BERT, RAG, grounding and fine-tuning LLMs

MS **Rutgers University**, Statistics — Jan 2016 - May 2019

- GPA: 3.4/4.0 (Transcript)
- **Coursework:**
  - times series including ARIMA/GARCH/LSTM/GRU models, forecasting, changepoint detection
  - multivariate analysis including PCA, factor models, canonical correlation analysis
  - analysis of algorithms and complexity theory; cryptography including RSA
  - biostatistics / causal inference, survival models, synthetic control, DiD, matching

BA **American University**, Philosophy, *cum laude* — Aug 2005 - Dec 2007

- GPA: 3.67/4.0 (Transcript)

Experience

Amazon, Payments, Data Science Intern — Seattle, USA
Aug 2023 - Dec 2023

- Reduced churn from Amazon Currency Converter using parametric modeling (Cox proportional hazards (CPH) with time-varying covariates), accelerated failure time (AFT), multi-state models, as well as packages PySurvival and Scikit-Survival; provided richer business-actionable information compared to classification approaches to churn, including (1) probabilities of progression to the early warning signs of churn, (2) seller disbursement dollar amounts at risk, and (3) causal inference on variables driving churn, calling out the troubling features of each seller.

Google, Developer Intelligence, Data Science Intern — Sunnyvale, California
May 2023 - Aug 2023

- Built metric-monitoring system using Python targeting changepoints and trends by augmenting the PELT algorithm, with twin goals of spotting unusual activity in developer productivity and supporting dashboards for manual explorations of productivity. Validated system via simulations and used asymmetric Jaccard index to compare inferred changepoints and trend with the ground truth; asymmetry reflects greater danger of false negatives.

Google, Core Compute Analytics (CCA), Google Cloud, Data Science Intern — Sunnyvale, California, May 2022 - Aug 2022

- Led GCROC project aimed at classifying Borg compute jobs suitable for spatial shifting, with goal of reducing carbon and energy expenditure while limiting transmission costs, yielding a classifier that correctly recalls over 98% of shiftable Google Compute Units (GCU). Furnished ML pipeline with real-time classification of previously-witnessed Borg jobs as well as novel jobs. GCROC covered here in The Economist and here in Bloomberg.

Point72, Market Intelligence Intern — New York, New York, Jun 2021 - Aug 2021

- Analyzed streaming providers (Netflix, Disney+, etc) using Python, PySpark, and 30TB of alternative to develop leading indicators, metrics, KPIs, and graphics for use in dashboards available to market analysts and portfolio managers, preparing traders for Netflix's 75% stock price decline from 2021 to 2022.

Bank of America, Quantitative Risk Intern — Charlotte, North Carolina, Jun 2019 - Aug 2019

- Built monitoring system for anomalies in time series of credit card segments, including change-point detection; wrote Python package for enhanced user experience.

Tsinghua University, Lecturer of Western Philosophy — Beijing, P.R. China, Sep 2010 - Jun 2012

- Instructed students in seminars and composition at pre-eminent Chinese institution.

Publications

Volatility Forecasting Using Similarity-based Parameter Correction and Aggregated Shock Information David Lundquist, Daniel J. Eck arXiv:2406.08738 — June 2024

Presentations

Jane Street's Symposium, January 2021, Presented *Jump Diffusion with a Heterogeneous Poisson Process*, a method for modeling jumps in asset price series.

2024 NBER-NSF Time Series Conference at Penn, September 2024, scheduled to present poster for *Volatility Forecasting Using Similarity-based Parameter Correction and Aggregated Shock Information*

Additional Experience And Awards

University of Illinois Center for Innovation in Teaching & Learning

Spring 2020 LIST OF TEACHERS RANKED AS EXCELLENT BY THEIR STUDENTS

Fall 2020 LIST OF TEACHERS RANKED AS EXCELLENT BY THEIR STUDENTS

Technological Skills

Languages: Python, R, Unix, C++, Java, SQL, Shiny

Software: AWS tech stack, PyTorch, TensorFlow, Keras, JAX, PySpark, pandas, polars, dash, ggplot

Miscellaneous

Languages: Mandarin (proficient), Hindi (conversational), bahasa Indonesia (intermediate), French (intermediate), limited proficiency in each of Uyghur, Korean, Italian, Spanish, German, Arabic, Persian

Leisurely interests: international travel and development, global affairs and news, macroeconomics and social science, mentoring and tutoring youth, reading, the outdoors, foreign film