

# Patrick Ding

Texas A&M University, Department of Statistics

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## Education

### Texas A&M University

PHD STATISTICS

- GPA: 3.92
- Coursework: Bayesian statistics, machine learning, spatial statistics, deep learning, statistical computing

College Station, TX

Aug 2017–May 2022

### Princeton University

BSE OPERATIONS RESEARCH AND FINANCIAL ENGINEERING

- Certificate in applications of computing

Princeton, NJ

Sep 2011–Jun 2015

## Experience

### Microsoft

DATA SCIENCE INTERN

Seattle, WA

Jun 2021–Aug 2021

### Adobe

DATA SCIENCE INTERN

- Implemented Monte Carlo estimators of KL divergence between MCMC, variational Bayes, and MAP posteriors of state space models using R, Stan, and C++
- Evaluated machine learning models for predicting loss of accuracy of approximate inference algorithms for state space models
- Demonstrated viability of model for predicting when MAP gives accurate estimates

Lehi, UT

May 2018–Aug 2018

### AllianceBernstein

ASSOCIATE

- Guided investment decisions in Emerging Markets Multi Asset Portfolio with more than one billion dollars in assets by developing regression model for emerging market equity and foreign exchange returns
- Guided investment decisions for variance swap sleeves with tens of millions of dollars in assets by building Matlab tools for back testing market timing and selection strategies and developing regression model for predicting variance swap returns
- Expanded firm's risk management and volatility forecasting capability by modeling option implied volatility surface
- Enabled firm to fulfill additional requests for proposals by creating realistic option simulator in Matlab, supporting trading, expiration, transaction costs, and hedging behavior with multiple assets
- Communicated model results to team through daily updating Excel reports with Matlab COM automation and SQL server

New York, NY

Jun 2015–Jun 2017

## Projects

### Multivariate Gaussian probability and sampling

STATISTICS RESEARCH

- Reviewed two dozen algorithms for high dimensional multivariate Gaussian sampling and probability estimation
- Translated half dozen algorithm implementations from Matlab and Python to C++ and distributed in R packages
- Extending expectation propagation for multivariate Gaussian polytope probability estimation
- Applying normalizing flows to multivariate Gaussian probability estimation and sampling

Jan 2020–Present

### Word vectors for variational autoencoding topic modeling

DEEP LEARNING COURSE PROJECT

- Investigated the benefits of combining word embeddings and autoencoding topic models
- Implemented variational autoencoding topic models using PyTorch

Sep 2018–Jan 2019

## Publications

- A Sadeghian, M Armandpour, **P Ding**, DZ Wang (2019). DRUM: End-To-End Differentiable Rule Mining On Knowledge Graphs. *Advances in Neural Information Processing Systems*.
- M Armandpour, **P Ding**, J Huang, X Hu (2019). Robust negative sampling for network embedding. *Proceedings of the AAAI Conference on Artificial Intelligence*.

## Skills

R Rcpp – RcppArmadillo – data.table – dplyr – ggplot2 – mlr – R Markdown – Rstudio  
Python NumPy – matplotlib – PyTorch – JAX  
Other Git – Markdown – LaTeX – Unix – Bash – SSH – Matlab – Stan