Luis Damiano

2410 Snedecor Hall, Ames, IA 50011.
ldamiano@iastate.edu luisdamiano luisdamiano.github.io

Education

Iowa State University, Department of Statistics 2018-Present

Ph.D. Student in Statistics.

Universidad Nacional de Rosario, Department of Statistics 2014-2017

Master of Science in Applied Statistics. GPA 9.2/10 ($\sim$ 3.9/4).[1]

Thesis: "*Evaluating Forecast Accuracy of GARCH Volatility Models Applied to Daily Stock Prices in Argentina*." (Thesis; Slides)

Research performed while working full-time.

Pontificia Universidad Católica Argentina, Department of Administration 2006-2010

Bachelor of Business Administration, *summa cum laude*. GPA 8.9/10 ($\sim$ 3.9/4).[1]

Additional Ph.D.-level Coursework

Universidad Nacional de Rosario, Department of Statistics 2016-2017

Completed three courses: Bayesian Statistics, Measure Theory and Probability, and Panel Data Econometrics.[2]

Additional Master-level Coursework

Universidad Nacional de Rosario, Department of Administration 2011-2014

Master of Science in Finance. GPA 8.5/10 ($\sim$ 3.7/4). [1]

Completed coursework requirements for M.Sc. in Finance.

Research Interests

Bayesian statistics, computational statistics, time series analysis, state-space models (continuous and discrete latent states), dynamic linear models, hierarchical models, quantitative finance.

Publications

Published

- **Damiano L.**, Peterson B., Weylandt M. (2018) "*A Tutorial on Hidden Markov Models using Stan.*" Zenodo. (DOI 10.5281/zenodo.1284341). Accepted for publication in the proceedings of StanCon 2018 and invited to present.

[1] The U.S. equivalence, which is self-reported based on WES Country Resources, is provided for indicative purposes only.
[2] Students are allowed to take Ph.D.-level coursework prior to formal application to the Ph.D. program.

In Printing

- Ward E., Anderson S., **Damiano L.**, Hunsicker M., Litzow M. "*Modeling regimes with extremes: the bayesdfa package for identifying and forecasting common trends and anomalies in multivariate time-series data.*" Accepted for The R Journal.

In Preparation

- **Damiano L.**, Niemi J. "*Subfield yield analysis for precision agriculture*". Key concepts: novel data-processing algorithm for irregular, misaligned, and overlapping polygons; explicit modeling of error measurements for uncertainty quantification; Bayesian hierarchical spatio-temporal models.

Published Software

Published

- Ward E., Anderson S., **Damiano L.**, Hunsicker M., Litzow M. "*bayesdfa: Bayesian Dynamic Factor Analysis (DFA) with 'Stan'.*" An R Package available on CRAN. (Link)

In Preparation

- **Damiano L.**, Peterson B., Weylandt M. "*BayesHMM: Full Bayesian Inference for Hidden Markov Models.*" An R Package intended for CRAN. Work in progress as part of GSoC 2018. (GitHub repository)

Presentations

Talks

R/Finance 2019, Chicago, IL May 2019

- "*Bayesian Inference and Volatility Modeling Using Stan.*" Optional pre-conference tutorials with Michael Weylandt.
- "*Augmenting Trading Systems with Hidden Markov Models using BayesHMM..*" Full talk.

R/Finance 2018, Chicago, IL June 2018

- "*Bayesian Inference and Volatility Modeling Using Stan.*" Optional pre-conference tutorials with Michael Weylandt. (Slides)
- "*Hierarchical Hidden Markov Models in High-Frequency Stock Markets.*" Full talk. (Slides)

Inter-American Statistical Conference 2017, Rosario, Argentina October 2017

- "*Daily Stock Price Forecasts in Argentina Using Hidden Markov Models.*" (Slides)

R/Finance 2017, Chicago, IL May 2017

- "*A Quick Introduction to Hidden Markov Models Applied to Stock Volatility.*" (Slides; Notebook)

Posters

University of Arkansas 44th Annual Spring Lecture Series, Fayetteville, AR April 2019

- "*BayesHMM: Full Bayesian Inference for Hidden Markov Models.*" (Poster)

Research Experience

Iowa State University 2018-Present

Research Assistant for the Consortium for Cultivating Human and Naturally Regenerative Enterprises. Currently working on (i) Bayesian hierarchical spatio-temporal models for precision agriculture, and (ii) statistical emulation of computer experiments.

Universidad Nacional de Rosario 2016-2017

Graduate thesis for the M.Sc. in Applied Statistics program.

- Title: "*Evaluating Forecast Accuracy of GARCH Volatility Models Applied to Daily Stock Prices in Argentina.*" (Thesis; Slides)
- Advisor: María Teresa Blaconá.

GSoC Student for R Project for Statistical Computing Summer 2018

- Title: "*Full Bayesian Inference for Hidden Markov Models.*"
- Mentors: Brian Peterson and Michael Weylandt.

  R Package to run full Bayesian inference on Hidden Markov Models (HMM) using the probabilistic programming language Stan. We provide the user with an expressive interface to mix and match a wide array of options for the observation and latent models, including ample choices of densities, priors, and link functions whenever covariates are present. The software enables users to fit HMM with time-homogeneous transitions as well as time-varying transition probabilities. Implemented inference algorithms include forward (filtering), forward-backwards (smoothing), Viterbi (most likely hidden path), prior predictive sampling, and posterior predictive sampling. Convenience routines for convergence diagnosis, goodness of fit, and data analysis are provided. (GitHub repository).

GSoC Student for R Project for Statistical Computing Summer 2017

- Title: "*Bayesian Hierarchical Hidden Markov Models applied to financial time series.*"
- Mentors: Brian Peterson and Michael Weylandt.

  Investigation of full Bayesian posterior inference (MCMC) for Hierarchical Hidden Markov Models (HHMM) with applications to financial time series. Contributions included: Development of specialized priors to smooth posterior geometry and improve MCMC convergence; Adaptation of forward-backward and Viterbi algorithms to HHMM; Efficient implementation of Hamiltonian Monte Carlo for HHMM, suitable for high-frequency financial time series. (GitHub repository; Link)

Teaching Experience

Co-Instructor

Universidad Nacional de Rosario, Department of Statistics Spring 2018

Time Series Analysis (graduate level): Stationary ARMA Processes, Models of Non-stationary Time Series, Seasonality, Maximum Likelihood Estimation, Diagnostics and Model Selection, Forecasting, Intervention and Detection of Outliers. Introduction to State-Space Models. Instructor: M.T. Blaconá.

Teaching Assistant

Iowa State University, Department of Statistics 2018-2019

STAT 544 Bayesian Statistics (graduate level course).

STAT 101 Principles of Statistics (undergraduate level): instructor of laboratory sessions.

Pontificia Universidad Católica Argentina, Department of Administration Fall 2010

Finance II (undergraduate level): Valuation and Capital Budgeting, Return and Risk, Capital Structure and Dividend Policy. Instructor: G. Messina.

Professional Experience

FIRST Capital Markets, Head of Asset Management, Buenos Aires, Argentina 2015-2018

Development of quantitative strategies and deployment of GARCH for foreign exchange volatility, PCA of the yield curve, cross-sectional and time-series analysis on currency futures, Monte Carlo simulation to model delta-neutral commodity trading strategies, and hierarchical linear models for cohort analysis of credit portfolios.

FIRST Corporate Finance, Lead Structurer for ABS, Rosario, Argentina 2010-2015

Deloitte & Touche Corporate Finance Advisors prior to the spin-off in 2013. Primary responsibilities included structuring Asset-Backed Securities (ABS) as well as producing all the technical documents for the initial public offering. Quantitative aspects of the daily work included the statistical analysis of the historical performance of assets, handling databases with 100 million records, and forecasting cash flows.

Service

- Refereeing for METRON Journal.
- Founder and leader of the Gaussian Process reading group at Iowa State University.

References

Jarad Niemi (Ph.D. Advisor)

Associate Professor
Department of Statistics
Iowa State University

niemi@iastate.edu

María Teresa Blaconá (M.Sc. Advisor)

Distinguished Professor, Former Department Chair
Department of Statistics
Universidad Nacional de Rosario

mblacona@fcecon.unr.edu.ar

Brian Peterson (GSoC 2017 & 2018 Mentor)

Lecturer
Department of Computational Finance & Risk Management
University of Washington

Automated Proprietary Trading
Hehmeyer Trading Group, Chicago IL

bgpeters@uw.edu

Michael Weylandt (GSoC 2017 & 2018 Mentor)

Ph.D. Candidate
Department of Statistics
Rice University

michael.weylandt@rice.edu