Deepak Bastola - Curriculum Vitae

Contact Details

Deepak Bastola
514 2nd st e
Northfield, MN, 55057, USA

Webpage: https://deepbas.io/
Cell: (951)-502-7049
E-mail: dbastola@carleton.edu

Research Interests

Bayesian Statistics, Spatio-Temporal Statistics, Machine Learning, High-dimensional Statistics, Time Series Methodology, Markov Chain Monte Carlo (MCMC)

Education

University of California, Riverside

Ph.D. in Applied Statistics **Sept. 2016 - August 2021**

- Dissertation Topic: "Higher Order Accurate Estimation of Variance in Markov Chain Monte Carlo (MCMC)"
- Advisor: **Dr. James M. Flegal**
- **Relevant Coursework:** Computational Statistics, Stochastic Processes, Machine Learning, Bayesian Statistics, Advanced Probability, Linear Regression, Experimental Design

University of Goettingen, University of Padova, University of Innsbruck

Erasmus Mundus Joint M.S. in Astronomy and Astrophysics **Oct. 2015**

- Thesis Topic: "Study of feedback mechanisms from Active Galactic Nuclei (AGNs)"
- Advisor: Dr. Wolfram Schmidt
- **Relevant Coursework:** Data Analysis in Astrophysics, Galaxy Dynamics, Stellar Populations, Cosmology, Stellar Astrophysics, Compact Objects

Texas A & M University

B.S. Physics, B.S. Mathematics **May 2013**

- Thesis Topic: "A study of properties of Type Ia Supernova and the calibration of multiband photometry"
- Advisor: Dr. Kevin Krisciunas
- **Relevant Coursework:** Linear Algebra, Real Analysis, Probability, Computational Physics, Thermal & Statistical Mechanics, Foundation of Mathematics, General Relativity

Skills

R, Posit, Python, Jupyter, Spark, PyTorch, SQL, Linux, Latex, High Performance Computing, Modeling, Simulations, Matlab, Fortran, SAS, Microsoft Office

Teaching

College	*Courses*	*Time*
Carleton College	STAT 230: Applied Regression Analysis	**Spring '22**
	STAT 220: Introduction to Data Science	**Winter, Fall '22 Spring '23**
	STAT 120: Introduction to Statistics	**Fall '21, Spring '22 Winter, Spring, Fall '23**
UC Riverside	STAT 147: Introduction to Quality Control	**Spring '21**
	STAT 100B: Introduction to Statistics	**Summer '20**

Student Supervision

Bayesian spatial modeling of coronavirus spread in Minnesota	**Winter, Spring '22**
Stock price modeling using deep learning models and Twitter sentiment	**Fall, Winter '22**
Global sensitivity analysis (GSA) for uncertainty quantification and propagation	**Summer, Fall '23**

Research Experiences

Ph.D. Dissertation Research

University of California, Riverside, California, USA **Sep. 2018 - Aug. 2021**

To get optimal bias-variance trade-off in uncertainty quantification of highly correlated finite sample Markov Chain Monte Carlo (MCMC) output, constructed near-optimal linear combination of variance estimators.

M.S. Thesis

University of Goettingen, Goettingen, Germany **Mar. 2015 - Oct. 2015**

To analyze the effects of incomplete physics and low resolution in Black Hole simulations, ran largescale cosmological simulations using High Performance Computing (HPC) platform and visualized results in matplotlib.

B.S. Thesis

Texas A & M University, College Station, Texas, USA **Aug. 2011 - Dec. 2012**

To disentangle the systematic bias, instrumental bias, and measurement uncertainties of the photometry of Supernova in ultraviolet band regime, conducted a study that led to an undergraduate thesis and a second author publication.

Work Experiences

Visiting Assistant Professor

Carleton College, Northfield, Minnesota, USA **Sep. 2021 - present**

Teaching undergraduate level introduction to statistics and data science courses. Supervised capstone level undergraduate thesis group projects.

Associate Instructor

University of California, Riverside, California, USA **Mar. 2021 - June 2021**

Taught an undergraduate course in introduction to quality improvements.

Associate Instructor

University of California, Riverside, California, USA **July 2020 - Sept. 2020**

Devised curriculum and taught an undergraduate summer course in introduction to statistics.

Teaching Assistant

University of California, Riverside, California, USA **Sept. 2017 - Aug. 2021**

Led lab and discussion sessions for 30 plus students on average each quarter. Held office hours, graded exams, and helped students with programming in R and Minitab.

Student Technician

Texas A & M University, College Station, Texas, USA **May 2011 - Aug. 2011**

Worked on data reduction and uncertainty estimation in photometric data from Supernovae. Published a second author paper and bachelors thesis under a prestigious undergraduate research scholars program.

Publications

Bastola, D., Flegal, J., Vats, D. *Higher Order Unbiased Estimators in Markov Chain Monte Carlo (MCMC)* 2023 **Forthcoming**

Krisciunas, K., **Bastola, D.**, Espinoza, J., Gonzalez, D., Gonzalez, L., Gonzalez, S., Hamuy, M., Hsiao, E.Y., Morrell, N., Phillips, M.M., Suntzeff, N.B. *Fixing the U-band photometry of Type Ia supernovae*. 2013, AJ, 145, 11

Bastola, D. 2012. *A Study of Properties of Type Ia Supernova and the Calibration of Multiband Photometry*. Honors and Undergraduate Research. http://hdl.handle.net/1969.1/148620

Relevant Projects

Predictive Models for Heart Disease Detection

University of California, Riverside **Spring 2018**

Compared the predictive power of various machine learning algorithms in terms of misspecification rate (MSR) and receiver operating characteristic (ROC). Concluded that logistic regression with regularization and ensemble-based methods outperform other methods.

Nonparametric Regression Analysis

University of California, Riverside **Winter 2018**

Density estimation of regression function using kernel smoothing, local polynomial regression, and spline smoothing methods to identify variables that have predictive power. Tuned parameters in the model by cross-validation procedures, used extensive visualizations, and reported the findings in a research paper.

Longitudinal Analysis Group Project

University of California, Riverside **Winter 2018**

Collaborated with other statistics PhD students to model longitudinal data, identified the correct covariance structure, and quantitatively inferred important variables and treatment effects in toenail onchomycosis. Effectively communicated with the professor during project meetings, conducted an oral presentation, and reported the findings in a research paper.

Black-Scholes Geometric Brownian Motion

University of California, Riverside **Spring 2017**

Modeled stock prices as geometric Brownian motion and simulated European call options. Provided probability-weighted present value of the options' intrinsic value, presented the findings orally, and wrote a research paper.

Survival Analysis of Primary Biliary Cirrhosis (PBC)

University of California, Riverside **Fall 2017**

Investigated treatment effects on survival of patients with Primary Biliary Cirrhosis (PBC) using Cox proportional hazard model. Concluded that treatment was ineffective, identified important covariates for future predictions, and reported findings in a research paper.

Conferences & Poster Presentations

Oral presentation on Asymmetric Loss Functions in MCMC Estimation for Graduate Student Seminar, Department of Statistics, UC Riverside, USA	**2020**
Poster presentation of masters thesis at the Gran Sasso Science Institute, L'Aquila, Italy	**2015**
Oral presentation at the Annual Physics & Astronomy Research Conference, Texas A & M University, College Station, Texas, USA	**2011**
Oral Presentation at the Astronomy Undergraduate Research Symposium, University of Austin, Austin, Texas, USA	**2011**

Honors and Awards

Dean's Distinguished Fellowship, University of California, Riverside	**2016-17**
Erasmus Mundus Category A Fellowship, European Commission	**2013-15**
Jack-McIntyre Scholarships, Physics & Astronomy Dept, Texas A & M University	**2012-13**
Coleman Loyd Scholarships, Physics & Astronomy Dept, Texas A & M University	**2010-12**
Dean's List, Texas A & M University	**2010-12**
Mahatma Gandhi Outstanding Student, Indian Embassy, Nepal	**2005**

Professional Memberships

American Statistical Association, Institute of Mathematical Statistics, Astronomers without Borders