Debdeep Pati

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RESEARCH INTERESTS

Bayes theory and methods in high dimensions, high dimensional network analysis, efficient Bayesian computation, scalable algorithms for massive data, hierarchical modeling of complex shapes, point pattern data modeling, real-time tracking algorithms.

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Statistics, Florida State University, Tallahassee, Florida, USA **August 2012 to present**

EDUCATION

Duke University, Durham, North Carolina, USA

Ph.D., Department of Statistical Science (May 2012)
- Thesis Topic: Bayesian nonparametric modeling and theory for complex data
- Advisor: Professor David B. Dunson
- Area of Study: Nonparametric Bayes

Master of Science, Department of Statistical Science, Dec 2010
- Thesis Topic: Bayesian nonparametric regression with varying residual density
- Advisor: Professor David B. Dunson
- Area of Study: Nonparametric Bayes

Indian Statistical Institute, Kolkata, West Bengal, India

Master of Statistics, Department of Statistics, June 2008
- First Division with Distinction
- Specialization: Mathematical Statistics and Probability

Bachelor of Statistics, Department of Statistics, June 2006
- First Division with Distinction
- Project Topic: Nonparametric inequality measure based on ranks

AWARDS

International Society for Bayesian Analysis
- Honorable mention for the Leonard J. Savage Award for outstanding dissertation in Bayesian statistical theory and methods, 2013

National Science Foundation
- Travel Award for attending NSF workshop on high-dimensional theory, methods and applications, Yale University
- Travel Award for attending 9th Workshop in Bayesian nonparametrics, Amsterdam, The Netherlands
- Travel Award for attending ISBA, 2014, Cancun, Mexico
- Travel Award for attending 10th Workshop in Bayesian nonparametrics 2015, Raleigh, NC, USA
- Travel Award to participate in the Mathematics Research Communities (MRC) conference on Algebraic Statistics, 2016, Snowbird, Utah

The American Statistical Association
- Student paper competition award, Section on Bayesian Statistical Science (SBSS), 2012

National Science Foundation
- NSF travel award for participating in International Society for Bayesian Analysis (ISBA) World Meetings, Benidorm, Spain (June 2010)

International Society for Bayesian Analysis
- Finalist for the ISBA 10 / Valencia 9 Student Video Competition, Benidorm, Spain (June 2010)

International Biometric Society
- Distinguished student paper award, International Biometric Society (ENAR), 2010

Duke University, Durham, North Carolina
- University Scholarship, 2008-2009

Indian Statistical Institute, Kolkata
- University Scholarship, 2003-2008
- Prizes for good performances in various semesters, 2003-2008

Jagadis Bose National Science Talent Search
- JBNSTS Senior Scholarship, 2003-2008

West Bengal Board of Higher Education
- Stood 32nd in West Bengal Board of Secondary Education out of 600000 students
- Stood 32nd in Joint Entrance Examination out of 100000 students
- Stood 4th in West Bengal Council for Higher Secondary Education out of 400000 students

TEACHING

- Introductory Probability I, STA4442/5440, FSU, Fall 2012, Fall 2013
- Fundamentals of Biostatistics, STA5172, FSU, Spring 2013, Spring 2014
- Nonparametric Bayes methods, STA5934, FSU, Fall 2014, Fall 2016
- Statistical Inference, STA5327, FSU, Spring 2015, Spring 2016
- Advanced Probability and Inference II, STA6448, FSU, Spring 2016

PUBLICATIONS $(\star \rightarrow \text{PhD student})$

- **Pati D.**, Reich B.J. and Dunson D.B. (2011). Bayesian geostatistical modeling with informative sampling locations. *Biometrika* **98** (1): 35-48. Winner of the ENAR Distinguished student paper award.

- **Pati D.**, Dunson D.B and S.T. Tokdar (2013). Posterior consistency in conditional distribution estimation. *Journal of Multivariate Analysis*, **116**: 456-472.

- **Pati D.** and Dunson, D.B. (2014). Bayesian nonparametric regression with varying residual density. *The Annals of the Institute of Statistical Mathematics*, **66** (1): 1-31.

- Bhattacharya A., **Pati D.** and Dunson D.B. (2014) Anisotropic function estimation using multi-bandwidth Gaussian processes. *The Annals of Statistics*, **32** (1): 352-381.

- **Pati D.**, Bhattacharya A., Pillai N.S. and Dunson D.B. (2014) Posterior contraction in sparse Bayesian factor models for massive covariance matrices. *The Annals of Statistics*, **42** (3): 1102-1130.

- Sarkar A.⋆, Mallick B., Staudenmayer J., **Pati D.**, Carroll R.J. (2014) Bayesian Semiparametric Density Deconvolution in the Presence of Conditionally Heteroscedastic Measurement Errors. Winner of the SBSS student paper award. *Journal of Computational and Graphical Statistics*, **23** (4): 1101-1125.

- Cervone D.⋆, Pillai N.S., **Pati D.**, Berbecko R. and Lewis J.H. (2014) A location-mixture autoregressive model for online forecasting of lung-tumor motion. *The Annals of Applied Statistics*, **8** (3): 1341-1371.

- Gu K.⋆, **Pati D.** and Dunson D.B. (2014) Bayesian Multiscale Modeling of Closed Curves in Point Clouds. *Journal of the American Statistical Association*, **109** (508): 1481-1494.

- Bhattacharya A., **Pati D.**, Pillai N.S. and Dunson D.B. (2015) Dirichlet Laplace priors for optimal shrinkage. *Journal of the American Statistical Association*, **110** (512): 1479-1489. (See BLOG entry: Gelman, A. (2013). Infill asymptotics and sprawl asymptotics. Statistical Modeling, Causal Inference, and Social Science).

- Tang Y.⋆, Sinha D., **Pati D.**, Lipsitz S.R., Lipshultz S. (2015) Bayesian Partial Linear Model for Skewed Longitudinal Data. (2013) Winner of the ENAR Distinguished student paper award. *Biostatistics*, **16** (3): 441-453.

- Zhang Z.⋆, **Pati D.**, Srivastava A. (2015) Bayesian clustering of shapes of curves. *Journal of Statistical Planning and Inference*, 166: 171-186.

- **Pati D.**, Bhattacharya A. (2015) Adaptive Bayesian inference in the Gaussian sequence model using exponential-variance priors. *Statistics & Probability Letters*, **103**, 100 -104.

- **Pati D.**, Bhattacharya A., Cheng G. (2015) Optimal Bayesian estimation in random covariate design with a rescaled Gaussian process prior. *The Journal of Machine Learning Research*, **16**, 2837-2851.

- Bhattacharya A., **Pati D.**, Pillai N.S. and Dunson D.B. (2016+) Sub-optimality of some continuous shrinkage priors. *Stochastic Processes and their Applications, to appear*.

- Norets A., **Pati D.** (2016+) Adaptive Bayesian estimation of conditional densities. *Econometric Theory, to appear*.

- Li H.⋆, **Pati D.** (2016+) Variable selection using shrinkage priors. *Computational Statistics & Data Analysis, to appear*.

- Sarkar A.⋆, **Pati D.**, Chakrabarty A., Mallick B., Carroll R.J. (2016+) Bayesian semiparametric multivariate density deconvolution. *Journal of the American Statistical Association*, to appear.

- **Pati D.** and Dunson D.B. (2016+) Bayesian fitting of closed surfaces through tensor products, *The Journal of Machine Learning Research*, accepted pending minor revisions. [Link]

Manuscripts submitted / under revision	($\star \to$ PhD student)

- Vo G.*, **Pati D.** (2016+) Sparse additive Gaussian process with soft interactions.

- **Pati D.**, Bhattacharya A. (2016+) Optimal Bayesian estimation in stochastic block models.

- Bhattacharya A., **Pati D.** (2016+) Bernstein von Mises theorems in Wasserstein distance.

- Geng J.*, Bhattacharya A., **Pati D.** (2016+) Probabilistic community detection with unknown number of communities.

- Wang L.*, Tang Y., Sinha D., **Pati D.**, Lipsitz S. (2016+) Bayesian Variable Selection for Skewed Heteroscedastic Response.

Invited Book Chapters

- Bayesian shape clustering, contributed by **Pati D.** in Nonparametric Bayesian Inference in Biostatistics and Bioinformatics, 57-76, edited by Mitra, R. and Müller, P., Springer-Verlag.

Completed Grants

- FSU-FYAP (PI: Pati), $ 20,000, 5/10/13 - 8/1/13, Bayesian shrinkage in high-dimensions: new developments

Ongoing Grants

- Office of Naval Research (PI: Debdeep Pati), $106,835, 7/1/14-6/30/17, Bayesian shrinkage priors for high-dimensional parametric and nonparametric models.

- NSF PD 08-1269 (PI: Debdeep Pati), $127,059, 7/1/16-6/30/19, Collaborative proposal: Scalable Bayesian methods for complex data with optimality guarantees.

Doctoral Advisees

- Yuanyuan Tang, PhD, Florida State University, (Biostatistician, Abbvie, Graduated 2013), jointly co-advised with Dr. Debajyoti Sinha. Winner of R.A. Bradley Award for best dissertation in the department of statistics in 2013.

- Hanning Li, Florida State University, (2013 - present)

- Gautam Sabnis, Florida State University, (2014 - present)

- Kumaresh Dhara, Florida State University, (2014 - present), co-advised with Dr. Debajyoti Sinha

- Junxian Geng, Florida State University, (2015 - present), co-advised with Dr. Elizabeth Slate

- Shuang Zhou, Florida State University, (2016 - present)

- Heli Gao, Florida State University, (2016 - present)

- Felicia Williams, PhD, Florida State University (graduated 2013)

- Michael Rosenthal, PhD, Florida State University (graduated 2014)

- Zhengwu Zhang, PhD, Florida State University (graduated 2015)

- Danisha Baker, Florida State University, (2014 - present)

- Mark Orndorff, Florida State University, (2015 - present)

- Ruite Guo, Florida State University, (2015 - present)

- Cherry Gupta, Florida State University, (2015 - present)

- Garret Vo, Florida State University (Industrial Engineering), (2014 - present)

- Kangwei Xing, Florida State University (Math), (2015 - present)

- Xin Li, Florida State University (Industrial Engineering), (2015 - present)

INVITED TALKS

- Bayesian community detection and goodness of fit tests in network models, 11th workshop on Bayesian nonparametrics, Paris, France (June 2017)

- Bayes theory and methods for large networks, Latent variables 2016 Conference, University of South Carolina (October 2016)

- Bayesian community detection and goodness of fit tests in network models, Department of Statistics, University of South Carolina (September 2016)

- Bayes theory and methods for large networks, Institute of Mathematical Statistics Asia Pacific Rim Meeting (4th IMS-APRM), Hong Kong (June 2016)

- Bayes theory and methods for large networks, SRCOS 2016 Summer Research Conference, Arkansas (June 2016)

- Bayes theory and methods for large networks, Bayesian Statistics Seminar, NCSU, Raleigh, NC (March 2016)

- Bayesian shape clustering, IISA 2015, Pune, India (December 2015)

- Bayes theory and methods for large networks, IASC-ARS 2015, Singapore (December 2015)

- Default variable selection using shrinkage priors, JSM 2015, Seattle, WA (August 2015)

- Real-time tumor tracking using a novel mixture of auto-regressive processes, WSC 2015, Rio de Janiero, Brazil (July 2015)

- Bayesian shrinkage in high-dimensions, University of California, Berkeley, CA (February 2015)

- Bayesian multi-scale modeling of closed curves in point clouds, JSM 2014 (August 2014)

- Nonparametric Bayes clustering of functional data, ISBA 2014, Cancun, Mexico (July 2014)

- Bayesian shrinkage in high-dimensions, IISA 2014, Riverside, California (July 2014)

- Bayesian partial linear model for skewed longitudinal data, KISS/ ICSA 2014, Portland, OR (June 2014)

- Bayesian shrinkage in high-dimensions, ISBIS/ SLDM 2014, Durham, NC (June 2014)

- Bayesian shape clustering, Texas A&M University, College Station, Texas (March 2014)

- Real-time tumor tracking using a novel mixture of auto-regressive processes, Purdue University, West Lafayette, Indianapolis (February 2014)

- Nonparametric Bayes clustering of functional data, FSU Computer Science Dept, Tallahassee, Florida (November 2013)

- On shrinkage priors in high dimensions, JSM 2013, Montreal, Canada (August 2013)

- Posterior contraction in sparse Bayesian factor models for massive covariance matrices, ISBA Regional Meeting, Varanasi, India (January 2013)

- On shrinkage priors favoring sparsity in high dimensions, Fox School of Business, Temple University, Friday Seminar, Philadelphia (October 2012)

- Bayesian fitting of closed surfaces through tensor products, Joint Statistical Meetings, San Diego (August 2012)

- Nonparametric Bayesian learning of low dimensional structure in higher dimensional data, Wharton Statistics Seminar, Pennsylvania (March 2012)

- Nonparametric Bayesian learning of low dimensional structure in higher dimensional data, FSU Statistics Colloquium, Florida (February 2012)

- Nonparametric Bayesian learning of low dimensional structure in higher dimensional data, Data Seminar, Duke University, Durham (January 2012)

- Nonparametric Bayesian learning of low dimensional structure in higher dimensional data, UChicago Statistics Colloquium, Chicago (January 2012)

- Nonparametric Bayesian learning of low dimensional structure in higher dimensional data, UFlorida Statistics Seminar, Florida (January 2012)

- Bayesian closed surface fitting through tensor products, IISA Conference on Probability, Statistics, and Data Analysis, NCSU, Raleigh (April 2011)

- Posterior consistency in conditional distribution estimation, Session on Bayesian nonparametrics, 3rd ERCIM WG Conference on Computing & Statistics, London (December 2010)

- Nonparametric Bayes mean regression and conditional density estimation: theory & some applications, Carlo Alberto Stochastics Workshop, Moncalieri, Italy (June 2010)

TECHNICAL SKILLS

MATLAB experience: statistics, linear algebra and nonlinear numerical methods
MATLAB toolboxes: statistics, neural network, signal processing
R toolboxes: mcmc, coda, spbayes, tgp, bart
Programming: C, C++, PHP, SQL

Applications: TEX, LATEX, BIBTEX, Microsoft Office, and other common productivity packages for Windows, OS X, and Linux platforms

Operating Systems: Microsoft Windows XP/2000, Linux, Solaris, and other UNIX variants

EDITORIAL ACTIVITIES

- Associate Editor of Sankhya, Series A (Mathematical Statistics and Probability) (December 2015 - present)

PROFESSIONAL ACTIVITIES

- Reviewer for *Journal of the American Statistical Association, Biometrika, Journal of the Royal Statistical Society, Series B, The Annals of Statistics, Bernoulli, The Annals of Applied Statistics, Journal of Econometrics, Bayesian Analysis, Journal of Machine Learning Research, Journal of Statistical Planning and Inference, Journal of Nonparametric Statistics, Electronic Journal of Statistics, Biometrics, Metrika, IEEE Transactions in Signal processing.*

- Adhoc reviewer of Army research Office & NSF proposals

- Session chair at JSM 2012 on *Topics in Bayesian Statistics*

- Invited Reviewer of AISTATS 2014, AISTATS 2015, NIPS 2015

- Invited Reviewer of Mathematical Reviews

- Organizer of an invited session in ICSA 2016, Atlanta on June 12-15, 2016, Atlanta

- Organizer of an invited session in ISBIS/SLDM Meeting on June 9-11, 2014

- Organizer of "Bayesian asymptotics in big models" Invited Session, JSM 2013

- Organizer of "High-dimensional inference: classical and Bayesian perspectives", International Statistics Conference 2014, Colombo, Sri Lanka, December, 2014.

- Colloquium chair for FSU Statistics, 2013-2014

- Invited Discussant for ISBIS / SLDM 2014, Durham, NC (June 2014)

- Reviewer for SBSS Student paper competition, 2015

- Organizer of "Modern advancements in longitudinal data analysis" Invited Session, ISI World Statistics Congresses at Rio de Janeiro, Brazil from 26-31 July 2015.

MEMBERSHIP

- American Statistical Association

- Eastern North American Region, International Biometric Society

- International Society for Bayesian Analysis

- Institute of Mathematical Statistics

- International Indian Statistical Association