

Curriculum Vitæ of
SUBHASHIS GHOSHAL (variation: GHOSAL)

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Mailing & Office Address

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Basic Data

Age: 40 years
Sex: Male
Nationality: Indian (permanent resident of U.S.A.)

Academic Position

Department of Statistics, North Carolina State University, U. S. A.:

July, 2004–Present — *Associate Professor* (with tenure).

August 2001 — June, 2004, *Assistant Professor*.

School of Statistics, University of Minnesota, U. S. A.:

January 2000–August, 2001 — *Assistant Professor*

Division of Mathematics and Computer Science, Free University, Amsterdam,
The Netherlands:

October 1997–December 1999 — *Post Doctoral Fellow*

Division of Theoretical Statistics and Mathematics, Indian Statistical Institute,
Calcutta, India:

March, 1997–September, 1997 — *Visiting Scientist*;

March, 1995–February, 1997 — *Post Doctoral Fellow*;

July, 1990–February, 1995 — *Research Fellow*.

Education

Ph.D. (Statistics), 1995, Indian Statistical Institute, Calcutta, India.

TITLE: Asymptotic Properties of Posterior Distribution and Study of
Some Nonregular Cases.

ADVISOR: Professor J. K. Ghosh

M. S. (Statistics), 1990, Indian Statistical Institute, Calcutta, India.

B. S. (Statistics), 1988, Indian Statistical Institute, Calcutta, India.

Awards

1. International Indian Statistical Association Young Researcher Award
in Theoretical Statistics, 2006–2007.
2. Fellow of the Institute of Mathematical Statistics, 2006
3. Sigma Xi research award and elected to be a member of Sigma Xi,
2004.
4. Selected as one of the most promising young researcher to present at
IMS organized section of JSM 2000.
5. Young Scientist award by the Indian Science Congress in its 82nd ses-
sion (1995).
6. Professor P. C. Mahalanobis Gold Medal (by the Indian Statistical
Institute) awarded to the most outstanding student in M. Stat. (1990).
7. Indian Statistical Institute Alumni Association Gold Medal for perfor-
mance in the M. Stat. (1990).

8. Indian Statistical Institute Alumni Association Gold Medal for performance in the B. Stat. (1988).
9. Prizes for good performance in exams 1985–1990.

Funded research

1. **NSF (DMS-Statistics) CAREER AWARD 2003:** *Default Bayesian Methods for Nonparametric Problems*. Proposal number 0349111. Funding level \$400,000. Single PI grant. Duration: 06/01/2004–05/31/2009.
2. Faculty course release and a student support for the academic year 2004-2005 obtained from NSF for serving as a member of the faculty team for SAMSI program on Latent variable Models for Social Sciences.

Research Interests

Nonparametric Bayesian inference, multiple hypothesis testing, high dimensional data, ROC analysis, Bayesian imaging, Noninformative priors, Asymptotic properties of the posterior distributions, Nonregular cases, Bayesian computation, Nonparametric regression, Recurrent event data, Limit theorems in probability.

Doctoral Student Advising

1. **Yongqiang Tang:** Ph. D. November 2003, North Carolina State University.
Thesis title: *Bayesian Nonparametric Estimation of the Transition Density and Prediction in a Markov Process*.
2. **Changku Kang:** December 2005. North Carolina State University.
Thesis title: *Bayesian Regression Via Clustering Using Dirichlet Process*.

3. **Liansheng Zu:** (co-advised with Sujit Ghosh): July 2006. North Carolina State University.
Thesis title: *Analyzing Longitudinal Data with Non-ignorable Missing.*
4. **Jiezhun Gu:** July 2007. North Carolina State University.
Thesis title: *Nonparametric and semiparametric inference about ROC curve.*
5. **Yuefeng Wu:** Currently working, expected November 2008.
6. **S. McKay Curtis:** (co-advising with Sujit Ghosh) Currently working, expected July 2008.
7. **Wookyeon Hwang:** Currently working, expected May 2009.
8. **Carl Dicasoli:** (co-advising with Sujit Ghosh) Currently working, expected July 2009.
9. **John White:** Currently working, expected 2009–2010.

Publications

(in reverse chronological order.)

Books

1. *Theory of Nonparametric Bayesian Inference*, (with Aad van der Vaart), under contract from Cambridge University Press, (expected in 2009).
2. *Pushing the Limits of Contemporary Statistics: Contributions in honor of Professor Jayanta K. Ghosh* (edited volume with B. Clarke) IMS Collection - Volume 3, Institute of Mathematical Statistics, 2008.

Papers Published

- In Journals

1. Nonparametric Bayesian model selection and averaging (with J. Lember and A. W. van der Vaart). *Electronic Journal of Statistics*, **2**, pp. 63–89, 2008.
2. Nonparametric Bayesian estimation of positive false discovery rates (with Y. Tang and A. Roy). *Biometrics* **63**, pp. 1126–1134, 2007.
3. Convergence rates of posterior distribution for noniid observations (with A. W. van der Vaart). *Annals of Statistics* Vol. 35, No. 1, 192–223.
4. Posterior convergence rates of Dirichlet mixtures of normal distributions at smooth densities (with A. W. van der Vaart). *Annals of Statistics* Vol. 35, No. 2, 697–723.
5. A consistent nonparametric Bayesian procedure for estimating autoregressive conditional densities (with Y. Tang). *Computational Statistics and Data Analysis* Vol 51, 4424–4437.
6. Dirichlet mixture of normal models for Markov processes (with Y. Tang). *Journal of Statistical Planning and Inference* Vol. 137, 1711–1726, 2007.
7. Bayesian nonparametric binary regression using a Gaussian process prior (with N. Choudhuri and A. Roy). *Statistical Methodology* Vol. 4, 227–243, 2007.
8. Posterior consistency of Gaussian processes for nonparametric binary regression (with A. Roy). *Annals of Statistics* Vol. 34, No. 5, 2413–2429, 2006.
9. Bayesian consistency for Markov processes (with Y. Tang). *Sankhyā* Vol 68, No 2, pp. 227–239, 2006.
10. Bayesian estimation of the spectral density of a time series (with N. Choudhuri and A. Roy). *Journal of the American Statistical Association*, **99**, pp. 1050–1059, 2004.
11. Contiguity of the Whittle measure in a Gaussian time series (with N. Choudhuri and A. Roy). *Biometrika* **91**, No 1, pp. 211–218, 2004.

12. On Bayesian adaptation (with J. Lember and A. W. van der Vaart). *Acta Applicandae Mathematica*, **79**, No 1/2, pp. 165–175, 2003.
13. Adaptive Bayesian inference on the mean of an infinite dimensional normal distribution (with E. Belitser). *Annals of Statistics* **31**, No 2, pp. 536–559, 2003.
14. Posterior consistency for semiparametric regression problems (with M. Amewou-Atisso, J. K. Ghosh and R. V. Ramamoorthi). *Bernoulli* **9**, No. 2, pp. 291–312, 2003.
15. Entropies and rates of convergence for Bayes and maximum likelihood estimation for mixture of normal densities (with A. W. van der Vaart). *Annals of Statistics*, **29**, No. 5, pp. 1233–1263, 2001.
16. Convergence rates for density estimation with Bernstein polynomials. *Annals of Statistics*, **29**, No. 4, pp. 1264–1280, 2001.
17. Testing Monotonicity of Regression (with A. Sen and A. W. van der Vaart), *Annals of Statistics* **28**, No 4, pp. 1054–1082, 2000.
18. Convergence rates of posterior distributions (with J. K. Ghosh and A. W. van der Vaart), *Annals of Statistics* **28**, No 2, pp. 500–531, 2000.
19. Asymptotic normality of posterior distributions for exponential families when the number of parameters tends to infinity, *Journal of Multivariate Analysis* **74**, pp. 49–69, 2000.
20. Probability matching priors for non-regular cases. *Biometrika*, **86**, pp. 956–964, 1999.
21. Approximation of the posterior distribution in a change point problem (with J. K. Ghosh and T. Samanta). *Annals of the Institute of Statistical Mathematics*, **51**, No. 3, pp. 479–497, 1999.
22. Consistent semiparametric Bayesian inference about a location parameter (with J. K. Ghosh and R. V. Ramamoorthi), *Journal*

- of Statistical Planning and Inference*, **77**, No. 2, pp. 181–193, 1999.
23. Posterior consistency of Dirichlet mixtures in density estimation (with J. K. Ghosh and R. V. Ramamoorthi) *Annals of Statistics*, **27**, No. 1, pp. 143–158, 1999.
 24. Asymptotic normality of posterior distributions in high dimensional linear models. *Bernoulli*, **5**, No. 2, pp. 315–331, 1999.
 25. Complete convergence of martingale arrays (with T. K. Chandra). *Journal of Theoretical Probability* **11**, No. 3, pp. 621–631, 1998.
 26. On extensions of an inequality of Kolmogorov (with T. K. Chandra) *Calcutta Statistical Association Bulletin* **47**, No. 185–186, pp. 1–9, 1997.
 27. Normal approximation to the posterior distribution for generalized linear models with many covariates. *Mathematical Methods of Statistics*, **6**, No. 3, pp. 332–348, 1997.
 28. Reference prior in multiparameter nonregular cases. *Test*, **6**, No. 1, pp. 159–186, 1997.
 29. Expansion of Bayes risk for entropy loss and reference prior in nonregular cases (with T. Samanta). *Statistics and Decisions* **15**, pp. 129–140, 1997.
 30. Asymptotic expansions of posterior distributions in nonregular cases (with Tapas Samanta). *Annals of the Institute of Statistical Mathematics* **49**, pp. 181–197, 1997.
 31. Strong law of large numbers for weighted average of dependent variables (with T. K. Chandra). *Journal of Theoretical Probability* **9**, pp. 797–809, 1996.
 32. Extensions of the strong law of large numbers of Marcinkiewicz and Zygmund under dependence (with T. K. Chandra) *Acta Mathematica Hungarica* **71**, pp. 327–336, 1996.
 33. Asymptotic behaviour of Bayes estimates and posterior distribution in multiparameter nonregular cases (with T. Samanta). *Mathematical Methods of Statistics*, **4**, pp. 361–388, 1995.

34. On convergence of posterior distributions (with J. K. Ghosh and T. Samanta). *Annals of Statistics* **23**, pp. 2145–2152, 1995.
- In conference proceedings or book chapters (refereed)
 1. J. K. Ghosh’s contribution to statistics: A brief outline (with Bertrand Clarke). In *IMS Collection - Volume 3: Pushing the Limits of Contemporary Statistics: Contributions in honor of Professor Jayanta K. Ghosh* (B. Clarke and S. Ghosal, eds.), pp. 1–18, 2008.
 2. Posterior consistency of Dirichlet mixtures of beta densities in estimating positive false discovery rates (with A. Roy and Y. Tang). In *IMS Collection - Volume 1: Beyond Parametrics in Interdisciplinary Research: Festschrift in honor of Professor Pranab K. Sen*, (E. Pena and M. Silvapulle, eds.), pp. 105–115, 2008.
 3. Semiparametric accelerated failure time models for censored data (with Sujit Ghosh). In *Bayesian Statistics and its Applications* (S. K. Upadhyay *et al.*, eds.), Anamaya Publishers, New Delhi, 213–229, 2006.
 4. Bayesian methods for function estimation (with N. Choudhuri and A. Roy). *Handbook of Statistics* **25** (D. Dey., ed.), Elsevier, 2005, pp. 373–414.
 5. Invited discussion of “A Nonparametric Bayesian Approach to Inverse Problems” by R. L. Wolpert, K. Ickstadt and M. B. Hansen. In *Bayesian Statistics 7* (J. M. Bernardo *et al.*, eds.), Oxford University Press, pp. 403–417, 2003.
 6. Discussion of “New Tools for Consistency in Bayesian Nonparametrics” by G. Salinetti (with A. W. van der Vaart). In *Bayesian Statistics 7* (J. M. Bernardo *et al.*, eds.), Oxford University Press, pp. 369–384, 2003.
 7. Consistency issues in Bayesian nonparametric (with J. K. Ghosh and R. V. Ramamoorthi). In *Asymptotics, Nonparametrics and*

Time Series: A Tribute to Madan Lal Puri (Subir Ghosh, Ed.), Marcel Dekker, Inc. pp. 639–667, 1999.

8. Some elementary strong law of large numbers: a review (with T. K. Chandra). In *Frontiers in Probability and Statistics* (S. P. Mukherjee *et al.*, eds.) pp. 61–81, Narosa Publishing House, New Delhi, 1998.
9. Non-informative priors via sieves and packing numbers (with J. K. Ghosh and R. V. Ramamoorthi). In *Advances in Statistical Decision Theory and Applications* (S. Panchapakesan and N. Balakrishnan, Eds.), pp. 119–132, Birkhauser, Boston, 1997.
10. On Borel-Cantelli lemmas (with T. K. Chandra). In *Essays on Probability and Statistics, Festschrift in honour of Professor Anil Kumar Bhattacharya* (S. P. Mukherjee *et al.* (eds.)), Department of Statistics, Presidency College, Calcutta, pp. 231–239, 1994.
11. Stability and convergence of posterior in non-regular problems (with J. K. Ghosh and Tapas Samanta). In *Statistical Decision Theory and Related Fields V* (S. S. Gupta and J. O. Berger, eds.), pp. 183–199, 1994.

Papers Accepted for Publication

- In Journals

1. Strong approximations for resample quantile process and applications to ROC methodology (with J. Gu). *Journal of Nonparametric Statistics*, 2007.
2. Weak consistency results for general kernels in Bayesian density estimation (with Y. Wu). *Electronic Journal of Statistics*, 2008.
3. Convergence properties of sequential Bayesian D-optimal designs for phase I clinical trials (with A. Roy and W. F. Rosenberger). *Journal of Statistical Planning and Inference*, 2008.

4. Bayesian ROC curve estimation under binormality using a partial likelihood based on ranks (with J. Gu). Revision invited from the *Journal of Statistical Planning and Inference*, 2008.
 5. Nonparametric estimation of ROC curve (with J. Gu and A. Roy). *Statistics in Medicine* (invited revision submitted), 2008.
- In conference proceedings or book chapters (refereed)
 1. Clusterwise regression using Dirichlet mixtures (with C. Kang). In *Indian Statistical Institute Platinum Jubilee volume*. World Scientific Press, Singapore, 2008. [A shorter version of this paper appears in the JSM Proceedings, 2007, Section on Nonparametric Statistics, 1624–1631.]
 2. Bayesian nonparametric approach to multiple testing (with A. Roy). In *Indian Statistical Institute Platinum Jubilee volume*. World Scientific Press, Singapore, 2008.
 3. Dirichlet process, related priors and posterior asymptotics. In *Bayesian Nonparametrics in Practice*, Cambridge University Press, 2008.

Papers Submitted/to be Submitted for Publication

(Preprints available)

1. Bayesian variable selection techniques for generalized additive regression models (with S. McKay Curtis). Preprint.
2. Bayesian ROC curve estimation under binormality without the gold standard for the truth (with J. Gu). Under preparation.
3. Estimating false discovery rates under dependence: a mixture model approach (with A. Roy). Preprint.
4. FIRST: Combining forward selection and shrinkage in high dimensional linear regression (with W. Hwang and H. Zhang). Preprint.

5. Posterior consistency for some semiparametric problems (with Y. Wu).
Preprint.

Extended abstracts and other publications different from above

1. Bayesian curve estimation on compact interval. Extended abstract: Proceedings of 8th Vilnius conference, 2001.
2. Default Bayesian methods for nonparametric problems. Extended abstract: Proceedings of European Meeting of Statisticians, 2001.
3. A review of consistency and convergence of posterior distributions. In *Proceedings of National Conference in Bayesian Analysis*, Benaras Hindu University, Varanashi, India, 2000.

University and professional services

• Editorial activities

1. Associate editor, *The Annals of Statistics*, 2005–present.
2. Co-editor of *Sankhyā*, the Indian Journal of Statistics, 2004–present.
3. Associate editor, *Electronic Journal of Statistics*, 2007–present.
4. Associate Editor, *Statistics Surveys* 2005–present.

• Academic Activities

Young Researcher Award Committee, International Indian Statistical Association, 2008.

Member of faculty team for SAMSI program Latent Variable Models for Social Sciences, 2004–2005.

IMS nominee to the ISBA.

Member of the program committee of eight Valencia conference, 2006.

Regularly referee papers for many journals including *Annals of Statistics*, *Journal of the American Statistical Association*, *Probability Theory and Related Fields*, *Bernoulli*, *Journal of Multivariate Analysis*, *Scandinavian Journal of Statistics*, *Sankhyā*, *Australian Journal of Mathematics*, *Calcutta Statistical Association Bulletin*, *Statistics and Probability Letters*, *Journal of Statistical Planning and Inference*, *Econometric theory*, *Statistica Sinica*, *Metrika*, *Metron*, *Journal of Korean Statistical Society*, *Indian Journal of Pure and Applied Mathematics*, *IEEE transaction on Pattern Recognition and Machine Learning*

Regularly review proposals submitted to *National Science Foundation*.

- **Doctoral Committee Member**

Served as or currently serving as a member of doctoral committee:

North Carolina State University: Lovely Goyal (Statistics), Daniel Finkel, Girish Ramachandra (Operations Research), Suvajit Samanta (Bioinformatics) and numerous masters committees (occasionally as chair).

Other institutions: Natesh Pillai (Duke University), Taeryon Choi (Carnegie Mellon University), Pam Binns (University of Minnesota).

- **Inter-disciplinary collaboration**

Participating in Engineering Research Center proposal at NCSU and UIUC initiated by Paul Franzon, ECE, to address statistical issues in this multi-disciplinary research.

- **Consulting**

1. Served as the faculty advisor for consultant Trena Phipps on a project on psychological test of working environments.
2. Served as the faculty advisor for consultant Sanggohn Han on a project on network sharing protocol.

3. Served as the faculty advisor for consultant Ming Xiong on a project on survey of consumer preferences for specific patterns and images in printed textiles.

- **Committee work**

Served in many departmental committees including Statistics search committee (2004-05; 2005-06), chair of Ph. D. qualifier committee (August 2005; January 2006), prelim committee (2003; co-chair 2008), curriculum committee (2006-07), post-tenure review committee (2008), PAMS research advisory council (2008-11).

Conferences, seminars and academic visits

1. **Invited speaker** in International *Indian Statistical Association meeting* 2008, Storrs, CT (forthcoming); *Indian Statistical Institute Platinum Jubilee Conference*, Kolkata, India, 2008; *Bayesian Nonparametric Regression*, Cambridge, U.K., 2007; WNAR-IMS session 2007, Irvine, CA; at *Multivariate Conference in Honor of S. N. Roy* 2006 Kolkata, India; *Mini symposium on Bayesian nonparametrics*, Storrs, 2006; *Joint Statistical Meeting*, 2006, Seattle; *IMS Annual Meeting*, 2006, Rio de Janeiro, Brazil; *Bayesian Nonparametric Workshop*, 2006, Jeju Island, Korea; *Bayesian Nonparametric Workshop*, Rome, 2004; *Army Research Conference*, Raleigh, 2002; *IMS Annual Meeting* 2002; *8th Vilnius conference on Probability and Statistics*, Banff, 2002; *European Meeting of Statisticians*, Funchal, 2001; *Nonparametric Bayesian Workshop*, Ann Arbor, 2001; *Joint Statistical Meeting*, Indianapolis, 2000; *AMS-IMS-SIAM Summer Research Conference*, Mount Holyoke, 2000; *International Workshop on Objective Bayesian Methodology*, Valencia, 1999; *National Seminar on Bayesian Statistics and its Applications*, Varanashi, 1996; *National Seminar on Reliability and Survival Analysis*, Calcutta, 1995.
2. **Short course** on Bayesian Nonparameterics, 2007, Bilkent, Turkey;

- Bayesian Nonparametrics, 2006, Luminy, France; Bayesian Nonparametrics, 2007, Cambridge, UK.
3. **Speaker** at *Joint Statistical Meeting*, 2008, Denver, CO (forthcoming); *IMS Annual Meeting*, 2008, Singapore (forthcoming); *Joint Statistical Meeting*, Salt Lake City, UT, 2007; *Joint Statistical Meeting*, San Francisco, 2003; *Joint Statistical Meeting*, New York, 2002; *6th Purdue Symposium*, West Lafayette, 1998;
 4. **Invited discussant** at Objective Bayes 5, Branson, MO, June 4–8, 2005; *7th Valencia Meeting*, Tenerife, 2002.
 5. **Poster presenter** at *Regional Meeting of ISBA*, Laguna Beach, 2001, *6th Valencia Meeting*, Alcossebre, 1998.
 6. **Chaired** sessions in Objective Bayes 5, Branson, MO, June 4–8, 2005; Joint Statistical Meeting, Seattle, 2006; Multivariate conference Kolkata 2006; Indian Statistical Institute Platinum Jubilee Conference, Kolkata, 2008.
 7. **Attended** *Princeton meeting in honor of Peter Bickel*, 2006; 26th and 27th Lunteren Meeting, Lunteren, 1997 and 1998; *7th Vilnius Conference*, Vilnius, 1998; *International Conference in Multivariate Analysis*, New Delhi 1992; *International Conference in Quantum Probability*, New Delhi 1990; *Instructional Conference in Riemannian Geometry*, Bombay 1990; *Instructional Conference in Operator Algebra*, Bangalore 1990.
 8. **Visited** Isaac Newton Institute, Cambridge, U.K., 2007; Free University, Amsterdam, 2007; Bilkent University, Ankara, Turkey, 2007; Indian Statistical Institute, New Delhi, 2007; Indian Statistical Institute, Kolkata, 2007; Indian Statistical Institute, Kolkata, 2006; University of Florida, Gainesville, 2003; Indian Statistical Institute, Calcutta, 2003, 2004; Free University of Amsterdam, 2002, 2004; Utrecht University, 2002; University di Roma “La Sapienza”, 1999; University

of Hyderabad, 1996 and 1997; Indian Statistical Institute, Bangalore, 1996; Tata Institute of Fundamental Research, 1989.

9. **Seminars** at Jawaharlal Nehru University, New Delhi, 2007; Indian Statistical Institute, New Delhi and Kolkata, 2007; Free University, Amsterdam, 2007; UNC-Chapel Hill, Biostatistics, 2006; Carnegie Mellon University, 2005; University of Connecticut, 2004; Duke University, 2004; North Carolina Chapter of the American Statistical Association, 2004; University of Florida, Gainesville, 2003; University of North Carolina, Chapel Hill, 2003; Case Western Reserve University, 2002; Utrecht University, 2002; University Bocconi, 2002; EURANDOM, 2002; University of Maryland Baltimore County, 2002; Tilburg University, 2001; University di Roma “La Sapienza”, 1999; Michigan State University, 1998; Indian Statistical Institute, Calcutta, 1999, 2000, 2001, 2003, 2004; Free University, Amsterdam, 1997–1999; Indian Institute of Sciences, 1997; University of Hyderabad, 1996; Indian Statistical Institute, Bangalore, 1996; Hong Kong University of Science and Technology, 1996; Indian Statistical Institute, Calcutta, 1990–1997.

Society Membership

Institute of Mathematical Statistics (IMS), Bethesda, Maryland, U. S. A.
(life member).

Sigma Xi Scientific Research Society, Research Triangle Park, NC, U. S.
A.

Indian International Statistical Society (life member).

Indian Statistical Institute (life member).

International Society for Bayesian Analysis (ISBA).

American Statistical Association.

Teaching Experience

1. North Carolina State University:

- Statistics 810V: Bayesian nonparametrics (developed this special topics course);
- Statistics 779: Measure theory and advanced probability;
- Statistics 746: Stochastic Process (5 times);
- Statistics 361: Statistics for engineers (4 times);
- Statistics 810K: Weak convergence (developed this special topics course);
- Statistics 740: Bayesian Inference and Analysis;
- ST 521: Statistical Theory I (twice);
- ST 522: Statistical Theory II (twice).

2. University of Minnesota, Twin Cities:

Statistics 3021: Introduction to Probability and Statistics (4 times).

3. Indian Statistical Institute, Calcutta, India:

Statistical Methods in Large Samples, Non-parametric Inference, Asymptotic Theory of Inference (thrice), *Sequential Analysis and Optimal Stopping* (thrice), *Statistical Inference II, Probability tutorial* (twice), *Statistical Methods in Biology, Multivariate Analysis tutorial*.