Bodhisattva Sen

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Academic Positions

- Associate Professor, Dept. of Stat., Columbia University (from Jun. 2013)
- Assistant Professor, Dept. of Stat., Columbia University (from Jul. 2008)
- University Lecturer, Statslab, Univ. of Cambridge, UK (Jul. 2011 – Aug. 2012)
- Teaching Fellow at St. John's College, Cambridge, UK (Sep. 2011 – Aug. 2012)

Education

1. University of Michigan: Ph.D. program in Statistics 2004 - 2008
2. Indian Statistical Institute: M.Stat. (Graduated with Distinction) 2002 - 2004
3. Indian Statistical Institute: B.Stat. (Graduated with Distinction) 1999 - 2002

Grants

1. NSF CAREER award, DMS-1150435 ($400,088) from Jul. 2012 – Jun. 2017.
2. EPSRC Strategic Fund (from UK, £49,843) from Oct. 2011 – Sep. 2012.
3. NSF grant, AST-1107373 ($324,207; Co-PI) from Jul. 2011 – Jun. 2014.
4. NSF grant, DMS-0906597 ($100,077) from Jul. 2009 – Jun. 2012.

Students

- Ph.D. Thesis Advisor to: Emilio Seijo (Columbia U., graduated in July 2012), Rohit Patra (Columbia U., to graduate in July 2015)
- Post-doc. Advisor to: Subhra Sankar Dhar (U. of Cambridge, 2011–2012)
- Dissertation committee member of: Gongjun Xu (Columbia U., graduated in May 2013), Duane Lee (Astronomy, Columbia U., graduated in Sep. 2013)
- Ph.D. prelim committee member of: Atul Mallik (U. of Michigan, April 2011), Tzu-Jung Huang (Biostatistics, Columbia U., Nov. 2013)
- Summer interns: Arkopal Choudhury, Rupak Banerjee, Aritra Guha (Columbia U., June – July 2013)

Editorial Work

- Member of the Editorial Board, *J. Statist. Plann. Inference*, from January 2012.
- Member of the Editorial Board, *Sankhyā, Series A*, from January 2012.
- Associate Editor, *STAT* (a new journal of Intl. Stat. Inst.), from August 2012.

Core Statistical Publications

1. **Sen, B.** and Meyer, M. (2013). Testing against a parametric regression function using ideas from shape restricted estimation. (submitted)

2. Chatterjee, S., Guntuboyina, A. and **Sen, B.** (2013). Improved global risk bounds in isotonic regression. (submitted)

3. Gongjun, X., **Sen, B.** and Ying, Z. (2013). Bootstrapping a change-point Cox model for survival data. (submitted)

4. Guntuboyina, A. and **Sen, B.** (2013). Global risk bounds and adaptation in univariate convex regression. (submitted)

5. Mallik, A., **Sen, B.**, Banerjee, M. and Michailidis, G. (2013). Asymptotics for p-value based threshold estimation in dose-response settings. (submitted)

6. Patra, R. and **Sen, B.** (2013). Estimation in a two-component mixture model with applications to multiple testing. (revision requested, *J. Roy. Statist. Soc. Ser. B*)

7. Sen, A. and **Sen, B.** (2013). On Testing Independence and Goodness-of-fit in Linear Models. (minor revision requested, *Biometrika*)

8. Mallik, A., Banerjee, M. and **Sen, B.** (2013). Asymptotics for p-value based threshold estimation in regression settings. *Electron. J. Statist.*, **7**, 2477–2515.

9. Guntuboyina, A. and **Sen, B.** (2013). Covering Numbers for Convex Functions. *IEEE Trans. Inf. Theory*, **59**, 1957–1965.

10. Guntuboyina, A. and **Sen, B.** (2012). L_1 covering numbers for Uniformly Bounded Convex Functions. *Proceedings of the 2012 Conference on Learning Theory (COLT)*, JMLR W&CP 23: 12.1–12.13.

11. **Sen, B.** and Chaudhuri, P. (2012). On fractile transformation of covariates in regression. *J. Amer. Statist. Assoc.*, **107**, 349–361.

12. **Sen, B.** and Woodroofe, M. (2012). Bootstrap Confidence Intervals for Isotonic Estimators in a Stereological Problem. *Bernoulli*, **18**, 1249–1266.

13. Mallik, A., **Sen, B.**, Banerjee, M. and Michailidis, G. (2011). Threshold estimation based on a P-value framework in dose-response and regression settings. *Biometrika*,

98, 887–900. (Another version: **Sen, B.**, Banerjee, M., Michailidis, G. (2010) available at http://arxiv.org/abs/1008.4316)

14. **Sen., B.** and Chaudhuri, P. (2011). Mahalanobis's Fractile Graphs: Some History and New Developments. *International Journal of Statistical Sciences*, **11**, 17–35. (Invited paper for the special issue in honor of Prasanta Chandra Mahalanobis).

15. Seijo, E. and **Sen, B.** (2011). Nonparametric least squares estimation of a multivariate convex regression. *Ann. Statist.*, **39**, 1633–1657.

16. Seijo, E. and **Sen, B.** (2011). A continuous mapping theorem for the smallest argmax functional. *Electron. J. Statist.*, **5**, 421–439.

17. Seijo, E. and **Sen, B.** (2011). Change-point in stochastic design regression and the bootstrap. *Ann. Statist.*, **39**, 1580–1607.

18. **Sen, B.**, Banerjee, M. and Woodroofe, M. (2010). Inconsistency of Bootstrap: the Grenander Estimator. *Ann. Statist.*, **38**, 1953–1977.

19. McKeague, I. and **Sen, B.** (2010). Fractals with point impact in functional linear regression. *Ann. Statist.*, **38**, 2559–2586.

20. **Sen, B.**, Banerjee, M., Woodroofe, M., Walker, M.G. and Mateo, M. (2009). Streaming Motion in Leo I. *Ann. Appl. Statis.*, **3**, 96–116.

21. **Sen, B.**, Walker, M. and Woodroofe, M. (2009). On the Unified Method with Nuisance Parameters. *Statist. Sinica*, **19**, 301–314.

22. Woodroofe, M. and **Sen, B.** (2007). Discussion on 'The small-N Problem in High Energy Physics' by G.Cowan and 'Bayesian Methods in Particle Physics from Small-N to Large' By H.B. Prosper. *Statistical Challenges in Modern Astronomy (SCMA) IV, (Eds. G.J.Babu and E.D.Feigelson), ASP Conference Series*, **371**, 98–100.

23. **Sen, B.** and Banerjee, M. (2006). A Pseudo-Likelihood Method for Analyzing Interval Censored Data. *Biometrika*, **94**, 71–86.

24. **Sen, B.** (2005). Estimation and Comparison of Fractile Graphs using Kernel Smoothing Techniques. *Sankhyā*, **67**, 305–334. (Special issue on Quantile Regression and Related Methods).

Interdisciplinary Publications

1. Lee, D. M., Johnston, K. V., Tumlinson, J., **Sen, B.** and Simon, J.D. (2013). A Mass-Dependent Yield Origin of Neutron-Capture Element Abundance Distributions in Ultra-Faint Dwarfs. *Astrophysical Journal*, **774**, 103.

2. Alonso, J., Mateo, M., **Sen, B.**, Banerjee, M., Catelan, M. and Minniti, D. (2012). Uncloking globular clusters in the inner Galaxy. *The Astronomical Journal*, **143**, 70.

3. Alonso, J., Mateo, M., **Sen, B.**, Banerjee, M. and Braun, K. (2011). Mapping differential reddening in the inner Galactic globular cluster system. *The Astronomical Journal*, **141**, 146.

4. Walker, M.G., Mateo, M., Olszewski, E.W., **Sen, B.** and Woodroofe, M. (2008). Clean Kinematic Samples in Dwarf Spheroidals: An Algorithm for Evaluating Membership and Estimating Distribution Parameters When Contamination is Present. *Astronomical Journal*, **137**, 3109–3138.

5. Alonso, J., Mateo, M. and **Sen, B.** (2008). Uncloaking globular clusters of the inner Galaxy. *IAU Symposium 245: Formation and Evolution of Galaxy Bulges*, 359–360.

6. Walker, M.G., Mateo, M., Olszewski, E.W., Bernstein, R., **Sen, B.** and Woodroofe, M. (2007). The Michigan/MIKE Fiber System Survey of Stellar Radial Velocities in Dwarf Spheroidal Galaxies: Acquisition and Reduction of Data. *Astrophysical Journal Supplement Series*, **171**, 389–418.

7. Walker, M.G., Mateo, M., Olszewski, E.W., Gnedin, O.Y., Wang, X., **Sen, B.** and Woodroofe, M. (2007). Velocity Dispersion Profiles of Seven Dwarf Spheroidal Galaxies, *Astrophysical Journal*, **667**, L53–L56.

8. Walker, M.G., Mateo, M., Olszewski, E.W., Pal, J.K., **Sen, B.** and Woodroofe, M. (2006). On Kinematic Substructure in the Sextans Dwarf Spheroidal Galaxy. *Astrophysical Journal*, **642**, L41–L44.

Unpublished manuscripts (available at web-site)

1. Nag, A.K., **Sen, B.** and Bhaumik, D. (2006). Interest rate and size of credit – a non-parametric exploratory analysis.

Working Papers

1. Seijo, E., **Sen, B.** Bootstrapping Manski's maximum score estimator.
2. **Sen, B.**, Gongjun, X. Model based Bootstrap Methods for Interval Censored Data.

3. Chaudhury, A., Iyanger, G., Mazumder, R., **Sen, B.** An ADMM algorithm for convex regression.
4. Guha, A., **Sen, B.** Risk bounds and adaptation in multidimensional isotonic regression.
5. Woodroofe, M. and **Sen, B.** Have we seen a signal yet? A necessary condition for claiming discovery.
6. Sen, A. and **Sen, B.** On testing conditional independence.
7. Seijo, E., **Sen, B.** On local rates of convergence of the least-squares estimator of convex regression in multi-dimension.
8. Cheng, G., **Sen, B.** Semiparametric single index models with shape constrained link functions.
9. Lee, D. M., Johnston, K. V., **Sen, B.** A mass-dependent yield origin of R-process distributions in ultra-faint dwarfs.

Honors and Awards

1. IMS Laha Travel Award to attend the Joint Statistical Meetings (JSM)/IMS Annual Meeting in Salt Lake City, Utah, July 29-August 2, 2007.
2. Rackham Travel Grant (2006, 2007) to present at the JSM.
3. Outstanding First Year Ph.D. Student (2005) at the University of Michigan, Ann Arbor.
4. Gold medal for outstanding performance in M.Stat. (2004) (Mahalanobis International Symposium on Statistics Prize).
5. Dewesh-Kamal scholarship for studies abroad from the Ramakrishna Mission Institute of Culture, Kolkata, August 2004.
6. Best student in the Visiting Student's Summer Program at the Harish Chandra Research Program, Allahabad, India (June - July, 2002).

Future Conferences/Session Organization

1. Statistical Society of Canada (May 2014, Toronto): Invited speaker in the session "Shape-Constrained Maximum Likelihood: Methods and Applications".
2. JSM (Aug. 2014, Boston): Invited speaker in the session "Statistica Sinica Young Statisticians Invited Session".
3. JSM (Aug. 2014, Boston): Organizer of an invited session on "Shape-restricted function estimation".

Conference/Workshop/Session Organization

1. 2nd Institute of Mathematical Statistics (IMS) Asia Pacific Rim Meetings, July 2-4, 2012, Tsukuba, Japan. Organizer and Chair of an Invited session on "Recent developments in Nonparametrics and related topics".
2. International Conference on Probability, Statistics and Data Analysis (ICPSDA-2011), April 21-24, 2011, Raleigh, USA. Organizer and Chair of an Invited session.
3. Joint Statistical Meetings, August 2010 (Vancouver, Canada). Organizer and Chair of Topic Contributed Session on "Shape Restricted Estimation and Inference".
4. Joint Statistical Meetings, August 2009 (Washington DC, USA). Organizer and Chair of Topic Contributed Session on "Inference in Non-standard Problems".
5. **Co-organizer** of the New York Workshop on Computer, Earth, and Space Sciences, at the NASA Goddard Institute for Space Studies, New York, N.Y. (February 6, 2009).

Presentations at Conferences and Workshops

1. 2nd Institute of Mathematical Statistics (IMS) Asia Pacific Rim Meetings, July 2-4, 2012, Tsukuba, Japan. Invited speaker in the session on "Bootstrap methods".
2. International Conference on Nonparametric Statistics, June 15-19, 2012, Chalkidiki, Greece. Invited speaker in the session "Nonparametric inference under shape constraints".
3. IMS-China International Conference on Statistics and Probability 2011, July 8-11, 2011, Xi'An, China. Invited speaker in the session on "High dimensional statistical inference".
4. Graybill 2011 conference on "Modern Nonparametric Methods", June 23-24, 2011, Fort Collins, Colorado. Invited speaker in the session on "Nonparametric estimation and inference with shape restrictions".
5. International Conference on Probability, Statistics and Data Analysis (ICPSDA-2011), April 21-24, 2011, Raleigh, USA. Invited speaker in the session on "Bootstrap methods".
6. 3rd International Conference of the ERCIM on COMPUTING & STATISTICS, December 10-12, 2010, Senate House, University of London, UK. Invited speaker in the track on "Quantile Regression and Semiparametric Methods".
7. Joint Statistical Meetings, August 2010 (Vancouver, Canada). Speaker at a Topic contributed session.
8. Statistical issues relevant to significance of discovery claims, July 2010 (Banff, Canada). Invited to the workshop at BIRS.
9. New England Statistics Symposium (NESS), April 2010 (Harvard, MA). (Invited speaker)
10. Conference on Resampling methods and High Dimensional Data, College Station, Texas (March 25-26, 2010). (Invited speaker)

11. International Indian Statistical Association Conference, Visakhapatnam, Andhra University, India (Jan 4-8, 2010). (Invited speaker)
12. Joint Statistical Meetings (JSM), 2009, Washington DC. Invited speaker in the session on "Threshold Estimation".
13. 1st Institute of Mathematical Statistics Asia Pacific Rim Meetings, June 28-July 1, 2009, Seoul, South Korea. Invited speaker in the session on "Recent developments in resampling methods and inference".
14. Symposium on "New Directions in Asymptotic Statistics", May 15-16, 2009 at the University of Georgia, Athens. (Invited speaker)
15. Twelfth North American Meeting of New Researchers in Statistics and Probability, July 28 - July 31, 2009 at Baltimore. (Invited speaker)
16. Statistical inference Problems in High Energy Physics and Astronomy, July 2006, Banff, Canada. (Invited speaker)
17. SAMSI High Energy Physics working group, March 2006. (Invited speaker)
18. Joint Statistical Meetings (JSM) 2008, Denver. (Topic contributed session)
19. Joint Statistical Meetings (JSM) 2007, Salt Lake City. (Contributed session)
20. Joint Statistical Meetings (JSM) 2006, Seattle. (Topic contributed session)
21. Statistical Challenges in Modern Astronomy, June 2006.
22. SAMSI Astro-statistics Workshop, January 2006.

Departmental Seminars

1. *Shape Restricted Functions: Some Theory and Applications.* Departmental Seminar, Wharton – Uni. of Penn., Philadelphia, November 2012.
2. *Estimation of a Two-component Mixture model.* Indian Statistical Institute, Kolkata, India, August 2012.
3. *Shape Constrained Estimation and Inference.* Departmental Seminar, ETH Zurich, Switzerland, May 2012.
4. *A statistical application in astronomy: Streaming motion in Leo I.* Seminar on applied Statistics, ETH Zurich, Switzerland, May 2012.
5. *Shape Restricted Estimation and Inference in Non–standard Problems.* University of Toronto, Canada, April 2011.
6. *Bootstrap in Some Non–standard Problems.* University of Cambridge, UK, January 2011.
7. *Shape Restricted Estimation and Inference in Non–standard Problems* (2010). Lehigh University, Bethlehem, November 2010.
8. *Shape Restricted Estimation and Inference in Non–standard Problems.* New York University, Stern School of Business, April 2010.
9. *(In)-consistency of Bootstrap in Non-standard Problems.* University of Maryland at Baltimore County, October 2009.

10. *Bootstrap in Non-standard Problems*. Yale University, September 2009.
11. *Bootstrap in some Non-standard Problems*. City University of New York, March 2009.
12. *Detecting Streaming motion in Leo I* (2008). Columbia University, Astronomy department, October 2008.
13. *Bootstrap in Non-standard Problems*.
    - North Carolina State University, January 2008.
    - Columbia University, January 2008.
    - University of California at Berkeley, January 2008.
    - University of California at Davis, January 2008.
    - Colorado State University, February 2008.
    - Texas A and M University, February 2008.
    - University of Minnesota, February 2008.
    - Rutgers University, February 2008.
    - University of Florida, February 2008.
    - Harvard University, February 2008.
    - Carnegie Mellon University, February 2008.
14. *Bootstrap in Non-standard Problems* (2007). University of Michigan, Ann Arbor, weekly Statistics Seminar, October 2007.
15. *Statistical Challenges in High Energy Physics* (2006). Bayesian Statistics and Interdisciplinary Research Unit, Indian Statistical Institute, Kolkata, September 2006.
16. *Resampling and Likelihood based Confidence Intervals in some non-regular problems* (2006). Statistics and Mathematics Unit, Indian Statistical Institute, Kolkata, August 2006.
17. *Fractile Graphical Analysis with Multiple Covariates* (2004). Mahalanobis International Symposium on Statistics, Indian Statistical Institute, Kolkata, July 2004.

Other Presentations

1. *Dwarf Galaxies: Star Contamination* (2007). Rackham Interdisciplinary Workshop on Statistical Topics, July 2007.
2. *Bootstrapping the Grenander Estimator* (2007). Contributed talk at the Joint Statistical Meetings, Salt Lake City, August 2007.
3. *On Fractile Regression* (2007). Poster presentation at Michigan Student Symposium for Interdisciplinary Statistical Sciences (MSSISS), March 2007.
4. *Fractile Graphical Analysis with Multiple Covariates* (2006). Topic Contributed talk at the JSM, Seattle, August 2006.
5. *Separating Member and Foreground Stars* (2006). Poster presentation in "Statistical Challenges in Modern Astronomy IV" at Penn State University, June 2006.

6. *Fractile Graphical Analysis - Some Applications* (2005). Quantitative Methodology Program Seminar Series, University of Michigan, March 2005.
7. Numerous presentations in Department student seminars on "Bootstrap", "Weak Convergence of Stochastic Processes", "Empirical Processes", "Kómlos-Major-Tusnády Coupling", "Skorohod Embedding Principle", etc.

Professional Services and Activities

1. *Refereeing for Journals:* Advances in Statistical Analysis; Annals of Statistics; Bernoulli; Biometrika; Canadian Journal of Statistics; Computational Statistics and Data Analysis; International Journal of Biostatistics; Journal of the American Statistical Association; Journal of Nonparametric Statistics; Journal of the Royal Statistical Society (Series B); Scandinavian Journal of Statistics; Statistica Sinica; Technometrics.
2. *Grant review:* National Security Agency Mathematical Sciences (NSA).
3. Student Paper Award Committee of the ASA Nonparametric Statistics Section, JSM 2010.
4. *Visiting Positions:* Visiting Research Scientist at the Indian Statistical Institute from August 19 - September 14, 2006.
5. Member of the student paper award committee for ASA Nonparametric Statistics Section for the year 2010.
6. *Membership in Professional Organizations:* IMS and ASA. Member since 2005.
7. *Mentored* graduate students with advanced Statistics and Probability courses and qualifying exams.
8. *Organizer* of the Joint Student Seminar Series with Michigan State University in 2006, the Rackham Interdisciplinary Workshop on Statistical Topics in Summer 2007 and the Student Seminar Series within the department since 2005.

Departmental Services

1. (2010-2011) Ph.D. Curriculum Committee; Ph.D. Qualifying Review Committee
2. (2009-2010) Ph.D. Curriculum Committee; Seminar Organization Committee
3. (2008-2009) Ph.D. Qualifying Review Committee; Seminar Organization Committee

Teaching Experience

1. Instructor of the Part II course "Statistical Modelling", January–March 2012, at University of Cambridge, UK.
2. Instructor of the Ph.D. course "Stat 6108: Theoretical Statistics II" in Spring 2011, at Columbia University.
3. Instructor of the Ph.D. course "Stat 6107: Theoretical Statistics I" in Fall 2010, at Columbia University.
4. Instructor of the undergraduate course "Stat 1211: Introduction to Statistics (with Calculus)" in Fall 2010, at Columbia University.

5. Instructor of the graduate course "Stat 4107: Introduction to Statistical Inference", in Spring 2010, Columbia University.
6. Instructor of the (double credit) graduate course "Stat 4109: Introduction to Probability and Statistical Inference", Fall 2009, Columbia University.
7. Instructor of the graduate course "Stat 4413: Introduction to Non-parametric Statistics", in Spring 2009, Columbia University.
8. Instructor of the undergraduate course "Stat 1211: Introduction to Statistics (with Calculus)" in Fall 2008, at Columbia University.
9. Graduate Student Instructor (GSI) at the University of Michigan from Fall 2004 through Winter 2006. Taught introductory Statistics courses to classes of about 60 students during Fall 2004 and Winter 2005. Course involved explaining scientific and mathematical concepts to students in non-technical terms.
10. GSI for the undergraduate Probability course (Fall 2005).
11. GSI for graduate courses: Introduction to Time Series Analysis (Fall 2005), advanced Probability and advanced course on theoretical Statistics (Winter 2006).

Scientific Softwares Skills

1. Extensive experience with C/C++ and Matlab, including software development for research projects.
2. Knowledge of Statistical packages - SPSS, S-Plus and R, Matlab.
3. Knowledge of Windows, Linux and Mac Operating systems.

References

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