Sarat C. Dass

Curriculum Vitae

ADDRESS:

Department of Statistics & Probability
A-439 Wells Hall
Michigan State University
E Lansing, MI 48824

CONTACT INFORMATION:

Phone : 517-432-5412
Fax : 517-432-1405
Email : sdass@stt.msu.edu
URL : http://www.stt.msu.edu/∼sdass

Research Interests

- Statistics for Spatial, Image and Object Data; Pattern Recognition; Fingerprint and biometric recognition; Bayesian Statistics.

Education

- *Ph. D. in Statistics*, Purdue University, 1998. Dissertation title : Unified Bayesian and Conditional Frequentist Testing Procedures. Advisor : James O. Berger.
- *M. S. in Statistics*, Purdue University, 1993-1995.
- *B. Stat. (Hons.)*, Indian Statistical Institute, Calcutta, India, 1990-1993.

Positions Held

- *Associate Professor*, Department of Statistics & Probability, Michigan State University, 2007-current.
- *Assistant Professor*, Department of Statistics & Probability, Michigan State University, 2000-2007.
- *Adjunct Associate Professor*, Department of Computer Science & Engineering, Michigan State University, 2004-2008.
- *Visiting Assistant Professor*, Department of Statistics, University of Michigan, 1998-2000.
- *Research Scholar*, Institute of Statistics and Decision Sciences, Duke University, 1997-1998.

Funded Grants

1. Sarat C. Dass (PI), Chae Y. Lim and T. Maiti, *"Modeling, Computational and Inferential Issues in Fingerprint and Health Monitoring Applications"*, National Science Foundation, Statistics Program. Amount: $169,495. Duration: 09/15/2011 - 08/31/2014.
2. Sarat C. Dass (PI) and Anil K. Jain, *"Statistical Methods for Fingerprint Image Analysis"*, National Science Foundation, Statistics Program. Amount: $200,000. Duration: 09/01/2007 - 08/31/2011.
3. Anil K. Jain and Sarat C. Dass (Co-PI), *"Fingerprints: Deformation, Individuality, Image Quality and Fusion"*, U. S. Army Research Office. Amount: $225,000.00. Duration: 01/09/06 - 08/31/09.

4. Anil K. Jain and Sarat C. Dass (Co-PI), *"Fingerprint Feature Extraction and Matching"*, National Science Foundation ITR Grant. Duration: 2003-2007. Amount: $230,000.00.
5. Anil K. Jain and Sarat C. Dass (Co-PI), *"Fingerprint Feature Extraction and Matching"*, REU Supplemental on the National Science Foundation ITR Grant. Amount: $6,000.00, Duration: 05/12/05 - 08/31/06.
6. Research Support for DoD Multimodal Biometrics by Lockheed Martin on collaborative research efforts by West Virginia University, Michigan State University, St. Lawrence and Clarkson University. Amount: $250,000.00. Duration: 12/01/04 - 12/13/05.

Scholarships and Honors

- Recipient of the Department of Statistics Award for Outstanding Classroom Teaching, Purdue University, 1997.
- Recipient of the Frederick N. Andrews Fellowship for Doctoral Studies, Purdue University, 1993-1995, for the School of Science.
- Recipient of the ISI Presidential Medal, Indian Statistical Institute, 1993, for securing top marks in the B. Stat. (Hons.) program.

Professional and Organizational Service

- Associate Editor, Sankhya B - The Indian Journal of Statistics. Duration: January 1st, 2012 to December 31st, 2013.
- Statistics Review Panelist for the National Science Foundation, February 8-10, 2012.
- Ph. D. External Examiner, Institute of Mathematical Sciences, University of Malaya, 2010-current.
- Ph. D. External Examiner, Indian Statistical Institute, Kolkata, India, 2010-current.

Publication

Journal Publications:

1. Y. Xu, J. Choi, S. C. Dass, and T. Maiti, "Sequential Bayesian Prediction and Adaptive Sampling Algorithms for Mobile Sensor Networks", *Accepted in IEEE Transactions on Automatic Control*, 2012.
2. Dass, S. C., Maiti, T. , Ren, H. and Sinha, S., "Confidence Interval Estimation of Small Area Parameters Shrinking Both Means and Variances", *Accepted in Survey Methodology*, 2012.
3. Lim, C. Y. and Dass, S. C., "Assessing Fingerprint Individuality Using EPIC: A Case Study In The Analysis Of Spatially Dependent Marked Processes", *Technometrics Featured Article*, vol. 53, no. 2, pp. 112-124, 2011.
4. Dass, S. C., Lim, C. Y. and Maiti, T., "Default Bayesian Analysis for Multivariate Generalized CAR Models", To appear in *Statistica Sinica*, 2011.
5. Khan, T., Ramuhalli, P. and Dass, S. C., "Particle Filter Based Multi-Sensor Fusion for Solving Low Frequency Electromagnetic NDE Inverse problems", *IEEE Transactions on Instrumentation & Measurement*, vol. 60, no. 6, pp. 2142 2153, 2011.

6. Dass, S. C, "Assessing Fingerprint Individuality in Presence of Noisy Minutiae", *IEEE Transaction on Information Forensics and Security*, vol. 5, no. 1, pp. 62-70, 2010.
7. Dass, S. C. and Li, M., "A Bayesian Analysis Of Hierarchical Mixtures With Application To Clustering Fingerprints", *Annals of Applied Statistics*, vol. 3, no. 4, pp. 1448-1466, 2009.
8. Kumar, M. and Dass, S. C., "A Total Variation-Based Algorithm for Pixel-Level Image Fusion", *IEEE Transactions on Image Processing*, vol. 18, no. 9, pp. 2137-2142, 2009.
9. Dass, S., Pankanti, S., Prabhakar, S. and Zhu, Y., "Fingerprint Individuality: Models and Methods". *Encyclopedia of Biometrics*, Springer, 2009.
10. Nandakumar, K., Chen, Y., Dass, S. C. and Jain, A. K., "Likelihood Ratio-Based Biometric Score Fusion", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 30, no. 2, pp. 342-347, 2008.
11. Dass, S. C. and Jain, A. K., "Data with Complex Structure - Fingerprint-Based Recognition, *Technometrics*, vol. 49, no. 3, pp. 262-276, 2007.
12. Zhu, Y., Dass, S. C., and Jain, A. K., " Statistical Models for Assessing the Individuality of Fingerprints", *IEEE Transactions on Information Forensics and Security*, vol. 2, no. 3, pp. 391-401, 2007.
13. Dass, S. C., Zhu, Y. and Jain, A. K., "Validating a Biometric Authentication System: Sample Size Requirements", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 28, no. 12, pp. 1902-1319, 2006.
14. Ross, A., Dass, S. C. and Jain, A. K., "Fingerprint Warping Using Ridge Curve Correspondences", *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 28, no. 1, pp. 19-30, 2006.
15. Dass, S. C., "Markov Random Field Models For Directional Field and Singularity Extraction in Fingerprint Images", *IEEE Transactions on Image Processing*, vol. 13, no. 10, pp. 1358 - 1367, 2004.
16. Ross, A., Dass, S. C. and Jain, A. K., "A Deformable Model for Fingerprint Matching", *Pattern Recognition*, vol. 38, no. 1, pp. 95-103, 2005.
17. S. C. Dass and V. N. Nair, "Edge Detection, Spatial Smoothing and Image Reconstruction with Partially Observed Data", *Journal of the American Statistical Association*, vol. 98, no. 461, pp. 77 - 89, 2003.
18. S. C. Dass and J. O. Berger, "Unified Bayesian and Conditional Frequentist Testing Procedures for Composite Hypotheses", *Scandinavian Journal of Statistics*, vol. 30, no. 1, pp. 193 - 210, 2003.
19. S. C. Dass and J. Lee, "A Note on the Consistency of Bayes Factors for Testing Point Null versus Nonparametric Alternatives", *Journal of Statistical Planning and Inference*, vol. 119, no. 1, pp. 143 - 152, 2003.
20. Dass, S. C., "Propriety of Intrinsic Priors in Invariant Testing Situations", *Journal of Statistical Planning and Inference*, vol. 92, no. 1-2, pp. 147-162, 2001.
21. S. C. Dass, "Unified Bayesian and Conditional Frequentist Testing Procedures for Discrete Distributions", *Sankhya Ser. B*, vol. 63, no. 3, pp. 251-269, 2001.

Conference Proceedings:

1. Xu, Y., Choi, J., Dass, S.C. and Maiti, T., "Efficient Bayesian Spatial Prediction with Mobile Sensor Networks Using Gaussian Markov Random Fields", *Accepted in Proc. of the American Control Conference (ACC)*, June 27-June 29, 2012, Montreal, Canada, USA.
2. Dass, S. C., Lim, C. Y. and Maiti, T., "Bayesian Variable Selection for Hierarchical Spatial Regression Models: Change-point regression models", *Proceedings of JSM*, August 2011.
3. Dass, S. C., Lim, C. Y. and Maiti, T., "A Generalized Mixed Model Framework for Assessing Fingerprint Individuality in Presence of Varying Image Quality", *Proceedings of JSM*, August 2011.
4. Xu, Y., Choi, J., Dass, S.C. and Maiti, T., "Bayesian Prediction and Adaptive Sampling Algorithms for Mobile Sensor Networks", *Proc. of the American Control Conference (ACC)*, June 29-July 1, 2011, San Francisco, California, USA.
5. Zhu, Y., Dass, S. C., and Jain, A. K., "Compound Stochastic Models for Fingerprint Individuality", *Proc. of International Conference on Pattern Recognition (ICPR)*, Hong Kong, August 20-24, 2006.
6. Nandakumar, K., Chen, Y., Dass, S. C., and Jain, A. K., "Quality-based Score Level Fusion in Multibiometric Systems", *Proc. of International Conference on Pattern Recognition (ICPR)*, Hong Kong, August 20-24, 2006.
7. Chen, Y., Dass, S. C. and Jain, A. K., "Localized Iris Image Quality Using 2-D Wavelets", *Proc. of International Conference on Biometrics (ICB)*, pp. 373-381, Hong Kong, January, 2006.
8. Chen, Y., Dass, S. C. and Jain, A. K., "Fingerprint Quality Indices for Predicting Authentication Performance", *Proc. of Audio- and Video-based Biometric Person Authentication (AVBPA)*, 2005, pp. 160-170, Rye Brook, NY, July 2005.
9. Dass, S. C., Nandakumar, K. and Jain, A. K., "A Principled Approach to Score Level Fusion in Multimodal Biometric Systems", *Proc. of Audio- and Video-based Biometric Person Authentication (AVBPA)*, 2005, pp. 1049-1058, Rye Brook, NY, July 2005.
10. Dass, S. C. and Jain, A. K., "Effects of User Correlation on Sample Size Requirements", *Proc. of the SPIE Defense and Security Symposium*, Orlando, FL, 2005.
11. Lu, X., Jain, A. K., and Dass, S. C., "3D Facial Expression Modelling for Recognition", *Proc. of the SPIE Defense and Security Symposium*, Orlando, FL, 2005.
12. Chen, Y., Dass, S. C., Ross, A. and Jain, A. K., "Fingerprint Deformation Models Using Minutiae Location and Orientation", *Workshop on the Applications of Computer Vision (WACV)*, Colorado, 2005.
13. Ross, A., Dass, S. C. and Jain, A. K.,"Estimating Fingerprint Deformation", *Proc. International Conference on Biometric Authentication (ICBA)*, Hong Kong, July 2004.
14. Nandakumar, K., Dass, S. C. and Jain, A. K., "Utilizing Soft Biometric Traits in Personal Recognition Systems"", *Proc. International Conference on Biometric Authentication (ICBA)*, Hong Kong, July 2004.
15. Jain, A. K., Dass, S. C., and Nandakumar, K. "Can Soft Biometric Traits Assist User Recognition", *Proc. of SPIE Vol. 5404, Biometric Technology for Human Identification*, pp. 561-572, Orlando, FL, April 2004.

16. Dass, S. C. and Jain, A. K., "Fingerprint Classification Using Orientation Field Flow Curves", *The 4th Indian Conference on Computer Vision, Graphics and Image Processing*, Kolkata, December 16-18, 2004.
17. S. C. Dass, A. K. Jain and X. Lu, "Face Detection And Synthesis Using Markov Random Field Models", *Proc. International Conference on Pattern Recognition*, Quebec City, August 11-15, pp 680-687, 2002.
18. S. C. Dass and A. K. Jain, "Markov Face Models", *The Eight IEEE International Conference on Computer Vision*, Vancouver, July 9-12, pp 680-687, 2001.

Tentatively Accepted and Submitted Papers

1. Dass, S. C., "Statistical Issues And Challenges In The Assessment Of Fingerprint Individuality", *Tentatively Accepted in International Statistical Review*, 2011.
2. Dass, S. C., Chae Y. Lim, and T. Maiti, "Clustering Cancer Mortality Curves of US States Based on Change Points", *Submitted to the Annals of Applied Statistics*, 2011.
3. Dass, S. C., Chae Y. Lim, and T. Maiti, "A Generalized Mixed Model Framework For Assessing Fingerprint Individuality In Presence Of Varying Image Quality", *Submitted to the Annals of Applied Statistics*, 2011.

Past Ph. D. Students:

1. Yongfang Zhu, Department of Statistics & Probability, Michigan State University. Date of Graduation: 2008.
2. Wenmei Huang, Department of Statistics & Probability, Michigan State University. Date of Graduation: 2011.

Current Ph. D. Students:

1. Zhen Zhang, Department of Statistics & Probability, Michigan State University.
2. Xin Qi, Department of Statistics & Probability, Michigan State University.

Departmental Responsibilities and Committee Work:

1. Graduate Support Committee, Department of Statistics & Probability, Michigan State University, 2007-2009, 2010-current.
2. Ph. D. Qualifying Examination Committee, Department of Statistics & Probability, Michigan State University, 2006-2009, 2010-current (Chair).
3. Major Curriculum Committee (Chair), Department of Statistics & Probability, Michigan State University, 2011-current.
4. Department representative in Curriculum Committee of Masters Program in Predictive Analytics at the Business School, Michigan State University, 2010-current.
5. Graduate Student Coordinator, Department of Statistics & Probability, 2007-2009.

6. Member of the Faculty Advisory Council, College of Natural Sciences, 2002-2004.

Professional Affiliations:

1. Member of the American Statistical Association (ASA).
2. Member of the ASA Mid-Michigan Chapter and Website Administrator, 2010-current.

Talks and Presentations:

1. "Predicting The Extent of Uniqueness Of A Fingerprint Match", Invited Talk, "Contemporary Issues and Applications of Statistics", Indian Statistical Institute, Kolkata, India. January 2012.
2. "Predicting The Extent of Uniqueness Of A Fingerprint Match", Indian School of Business, Hyderabad, India. December 2011.
3. "A Generalized Mixed Model Framework For Assessing Fingerprint Individuality In Presence Of Varying Image Quality", Invited Session, Joint Statistical Meetings, Miami Beach, FL. August 2011.
4. "Assessing Fingerprint Individuality using EPIC", University of Malaya, Malaysia, May 2011.
5. "Some Statistical Techniques for Analyzing Health Disparity and Disease Trends", National Cancer Institute, Washington D.C., April 2011.
6. "Point Processes with Spatially Dependent Marks: A Case Study in Fingerprint Analysis", Midwest Statistics Research Colloquium, Madison, Wisconsin, USA, March 2011.
7. "Point Processes with Spatially Dependent Marks: A Case Study in Fingerprint Analysis", Department of Statistics, Western Michigan University, October 2010.
8. "Default Bayesian Analysis for Multivariate Generalized CAR Models", Topic Contributed Session, Joint Statistical Meetings, Vancouver, August 2010.
9. "Hierarchical Mixture Models for Population of Objects", Bayesian and Interdisciplinary Research Unit, Indian Statistical Institute, March 2010.
10. "Hierarchical Mixture Models for Fingerprints", IMATI, Milan, January 2010.
11. "Assessing Fingerprint Individuality", Department of Mechanical Engineering Seminar at MSU, October 2009.
12. "A Bayesian Analysis of Hierarchical Mixtures", Bayesian and Interdisciplinary Research Unit, Indian Statistical Institute, Kolkata, India, January, 2009.
13. "Statistical Issues in Biometric Authentication", Multimedia University, Malacca, Malaysia, January, 2009.
14. "Markov Random Field Models for Directional Field Estimation and Singularity Extraction in Fingerprint Images", International Conference on Statistical Paradigms - Recent Advances and Reconciliations (ICSPRAR), Kolkata, India, January 01-04, 2008.
15. "Statistical Models for Assessing the Individuality of Fingerprints", Workshop on Biometrics, Institute for Mathematical Stochastics, University of Goettingen, Germany, Sept. 2007.

16. Gave lectures on various aspects of fingerprint-based biometric authentication at the Institute for Mathematical Stochastics, University of Goettingen, Germany, from May 12th - June 12th, 2005.
17. "Statistical Models for Feature Extraction and Matching in Fingerprint Images", Indian Statistical Institute, Kolkata, January, 2005.
18. "Point Process Models on Minutiae Features for Assessing Fingerprint Individuality", International Conference on Forensic Sciences, Arizona State University, March, 2005.
19. "Effects of User Correlation on Sample Size Requirements", SPIE, Orlando, March, 2005.
20. "Validating a Biometric Authentication System: Sample Size Requirements", Biometric Consortium Conference, Crystal City, Virginia, 2004.
21. "Some Aspects of Fingerprint Based Authentication Systems", Department of Statistics and Probability, September, 2004.
22. "Fingerprint Classification Using Orientation Field Flow Curves", The 4th Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP), Kolkata, December, 2004.
23. "Utilizing Soft Biometric Traits in Personal Identication Systems", Center for Identification Technology Research (CiTeR), November, 2003.
24. "Warping Models for Fingerprint Images", Department of Statistics and Probability Colloquium, September, 2003.
25. "Obtaining Smooth Directional Field Estimates for Fingerprint Images", Interface 2003, Salt Lake City. March, 2003.
26. "Edge Detection, Spatial Smoothing and Image Reconstruction with Partially Observed Multivariate Data", Department of Statistics Colloquium, Purdue University, October, 2002.
27. "Face Detection and Synthesis using Markov Random Field Models", International Conference on Pattern Recognition (ICPR '02), Quebec City. August, 2002.
28. "Markov Face Models", Interface 2002, Montreal. April, 2002.
29. "Markov Models for Face Detection", International Indian Statistical Association Conference, Dekalb, IL. June, 2002.
30. "Markov Models for Face Detection", Joint Statistical Meeting, ASA, Atlanta, Georgia, 2001.
31. "Markov Face Models", International Conference on Computer Vision, Vancouver, 2001.
32. "Edge Detection, Spatial Smoothing and Image Reconstruction with Partially Observed Multivariate Data", EAPRC Bernoulli Society, Kuala Lumpur, Malaysia, 2001.
33. "Identifying Operating Characteristics that Influence the Mean and Variance of Powder Coating Thickness on Metal Sheets: A Bayesian Approach", Conference on Reliability, University of Pune, Pune, India, 2001.
34. "On the Propriety of Intrinsic Priors in Invariant Testing Situations", Workshop on Objective Bayesian Methodology, Ixtapa, Mexico, 2000.
35. "Edge Detection, Spatial Smoothing and Image Reconstruction with Partially Observed Multivariate Data", Department of Mathematics Colloquium, McGill University, Montreal, Canada, 2000.

36. "Edge Detection, Spatial Smoothing and Image Reconstruction with Partially Observed Multivariate Data", Department of Statistics and Probability Colloquium, Michigan State University, 2000.
37. "Edge Detection, Spatial Smoothing and Image Reconstruction with Partially Observed Multivariate Data", Department of Mathematics Colloquium, University of Cincinnati, 2000.
38. "Edge Detection, Spatial Smoothing and Image Reconstruction with Partially Observed Multivariate Data", Department of Mathematics Colloquium, University of Missouri, Rolla, 2000.
39. "Unified Conditional Frequentist and Bayesian Testing Procedures", Department of Statistics Colloquium, University of Michigan, 1998.
40. "Unified Conditional Frequentist and Bayesian Testing Procedures", Department of Statistics Colloquium, University of Wisconsin-Madison, 1998.
41. "Unified Conditional Frequentist and Bayesian Testing Procedures", Graduate Student Seminar, Duke University, 1998.
42. "Unified Conditional Frequentist and Bayesian Testing Procedures", Graduate Student Seminar, Purdue University, 1996.

Refereeing Responsibilities:
Served as a reviewer for grant applications for the following agencies: NSF and NSA. Served as referee for a number of reputed journals of statistics and engineering such as The Annals of Statistics, Technometrics, Journal of the American Statistical Association, etc. (Statistics) and the IEEE Transaction Series such as PAMI, IFS, IP (Engineering). Served as a reviewer for articles submitted to peer-reviewed conferences.

Courses Taught:

• **Michigan State University**, 2000-current: Taught a mixture of large- and moderate-sized undergraduate course and graduate courses in Statistics. Course descriptions are as follows:

1. STT 200/201 "Statistical Methods".
2. STT 231 "Statistics for Scientists".
3. STT 315 "Introduction to Probability and Statistics for Business".
4. STT 430 "Introduction to Probability and Statistics".
5. STT 441 "Probability and Statistics I: Probability".
6. STT 461 "Introduction to Statistical Computing".
7. STT 865 "Modern Statistical Methods".
8. STT 871 and 872 "Mathematical Statistics I and II".
9. STT 890 "Topics in Survival Analysis".

• **University of Michigan**, 1998-2000

1. STAT 100 "Introduction to Statistical Reasoning".

2. STAT 470 “Introduction to Designs of Experiments”.

Statistical Consulting:

1. Developed and conducted workshops for the Statistical Consulting Service at Michigan State University on Bayesian MCMC simulation and computational techniques.
2. Consulted for TATA Motors Inc. in Pune, India, in 2008 and 2010.