

CURRICULUM VITAE OF  
**GUTTI JOGESH BABU**  
Director, Center for Astrostatistics  
<http://astrostatistics.psu.edu>

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**Citizenship:** United States of America

**Employment:** 1985–present      Professor, Pennsylvania State University.  
January 1982–85      Professor, Indian Statistical Institute, India.  
1976–December 1981      Associate Professor, Indian Statistical Institute, India.

**Education:** 1970      M. Stat., Indian Statistical Institute, Calcutta, India.  
1974      Ph. D., Indian Statistical Institute, Calcutta, India.

**Honors:** Elected Fellow - Institute of Mathematical Statistics.  
Elected Fellow - American Statistical Association.  
Elected Fellow - American Association for the Advancement of Science.  
Elected Member - International Statistical Institute.  
National Research Council's Twinning Fellowship for 1997-1999.  
Research Professor, Mathematical Sciences Research Institute, Berkeley (Jan.–Mar. 2005).  
Mid-Atlantic Region University Continuing Education Association award for exemplary  
non-credit program development (Summer school in statistics for astronomers), 2007.

**Visiting Appointments:**

Jan.-May. 2006      SAMSI University Fellow, Statistical and Applied Mathematical Sciences Institute,  
Research Triangle Park, NC, and University of North Carolina, Chapel Hill  
Jan. 2005      University of Hyderabad, India  
Dec. 1998      Indian Statistical Institute, India  
Oct.–Nov. 1998      Rutgers University  
Sep.–Oct. 1998      Concordia University, Canada  
June 1995      National Sun Yet-sen University, Kaohsiung, Taiwan  
May 1995      Indian Statistical Institute  
March 1992      Mathematical Sciences Research Institute, Berkeley  
Nov. 1991      Monash University, Australia  
Fall 1982      University of Ottawa  
1981–1982      Rutgers University  
Spring 1981      University of Arizona  
Nov.–Dec. 1980      Math. Inst. of the Hungarian Academy of Sciences, Budapest

Summer 1980    University of Ottawa  
1975–1976    University of Oregon  
1974–1975    University of Illinois at Urbana-Champaign  
1973–1974    Tata Institute of Fundamental Research, India

### Editorial and Professional Service:

Editor-in-Chief, *Statistical Methodology* from 2003.  
Coordinating Editor, *Journal of Statistical Planning and Inference* 1998 - 2004, and Associate Editor 1995 - 1997.  
Associate Editor, *Journal of Nonparametric Statistics* 1989 - 2007.  
Co-Editor, *Sankhyā, Series A* 1981 - 1993 and 1999 - 2007.  
Advisory Committee for *Sankhyā* 1993 - 1999.  
Search committee to select editors for the journal *Sankhya* 1998.  
Editorial Board, *International Indian Statistical Association* Conference Proceedings Volume.

Chair, *Institute of Mathematical Statistics (IMS)* Committee on **Fellows** 2002 - 2003.  
Member, IMS Committee on Fellows 2001 - 2004.

Member, *American Statistical Association's* Committee on Scientific Freedom and Human Rights (January 1, 2010 through December 31, 2012).

Chair, *Program Leaders Committee, SAMSI Astrostatistics Program*, January - May 2006.

Member, Weak Lensing Science Collaboration team (2006 -), *Large Synoptic Survey Telescope (LSST)*, <http://lsst.org>.  
Core team member of the proposed **LSST Informatics and Statistics Science Collaboration**.

Organized annual *Summer Schools in Statistics for Astronomers* since 2005 at Penn State.  
Also organized a summer school in statistics for astronomers in collaboration with the Indian Institute of Astrophysics in July 2007, and July 2008, at Vainu Bappu Observatory located near the village of Kavalur in India.

Program Chair, *International Indian Statistical Association*. 1998 - 2000.

Served on NSF and NASA panels, including:  
NSF Mathematical Sciences Postdoctoral Research Fellowships panel 2005 - 2006.  
Member, Executive committee for NSF MSP Postdoc panel 2006.

Written over 190 reviews for *Mathematical Reviews* and *Zentralblatt*.

Reviews research proposals for *NSF, NSA, Air Force Office of Scientific Research* and *Natural Sciences and Engineering Research Council of Canada*.

Referee for the journals: Annals of Probability, Annals of Statistics, Sankhyā, Probability Theory and Related Fields, Journal of the American Statistical Association, Journal of Multivariate Analysis, Journal of Environmental and Ecological Statistics, Annals of the Institute of Statistical Mathematics, Communications in Statistics, Canadian Journal of Statistics, Journal of Statistical Planning and Inference, Econometric Theory, Indian Journal of Statistics, The Astrophysical Journal, Statistics and Probability Letters, Sociological methodology, Technometrics.

### **Research Interests:**

Bootstrap and other resampling methods. Statistical applications to Astronomy and Physics. Nonparametric Methods. Inference for misspecified models. Goodness-of-fit tests when parameters are estimated. Analysis of massive datasets. Edgeworth expansions. Statistical Group Theory and its applications to Population Genetics. Inference on finite populations. Density quantile estimation. Asymptotic theory of empirical processes, quantiles and L-statistics. Large and Moderate deviations for dependent variables. Moderate deviations in general topological spaces. Probabilistic and Analytic number theory.

### **Research Grants:**

2009–10 Principal Investigator for ‘2009 Summer School in Statistics for Astronomers; June 8-13, 2009’. \$33,359. 3/15/2009 to 2/28/2010. NSF No. AST 0915069.

2008–10 Principal Investigator for ‘2008 Summer School in Statistics for Astronomers; June 9-14, 2008’. \$33,131. 3/1/2008 to 2/28/2010. NSF No. AST 0808877.

2007–10 Principal Investigator for ‘MSPA-AST: Advancing statistical methodology in massive astronomical surveys’. \$100,000. 9/15/2007 to 8/31/2010. NSF No. AST 0707833.

2007–08 Scientific Computing Research Environments for the Mathematical Sciences (SCREMS), Co-P.I. - G. J. Babu. \$50,000. 9/1/2007 to 8/31/2008. NSF No. DMS-0722351.

2005–2006 Principal Investigator for ‘Statistical Challenges in Modern Astronomy IV’. \$20,000. 9/15/2005 to 12/14/2006. NASA grant No: NNG05GQ16G.

2005–2007 Principal Investigator for ‘Research Experience for Undergraduates’ supplement (NSF Grant No. AST 0434234) to “Astrostatistics: Advancing statistical methodology for Astronomy” \$12,000. 7/5/2004-9/30/2007.

2004–2008 Principal Investigator for “Astrostatistics: Advancing statistical methodology for Astronomy”. \$508,359. 10/1/2004 to 9/30/2008. NSF No: AST-0434234.

2004–2007 Principal Investigator for “Center for Astrostatistics”, \$35,000. Penn State’s Outreach Program Innovation Fund.

2003–2008 ITR: Grid Service Workflow System as a Research Environment for Science with Massive Data Sets, Co-I G. J. Babu (PI. Roy D. Williams) NSF No. AST-0326524. \$3,117,508. (Penn State’s share \$215,000). 10/1/2003 to 3/31/2008.

2003–04 Scientific Computing Research Environments for the Mathematical Sciences (SCREMS), Co-P.I. - G. J. Babu. \$65,347. 8/1/2003 to 7/31/2004. NSF No. DMS-0322673.

2003–04 Principal Investigator for ‘Research Experience for Undergraduates’ supplement (Grant No. DMS-0332264) to, “Multivariate Statistical Methodology for the Virtual Observatory”. \$10,000. 6/15/2001 to 5/31/2004. NSF No. DMS-0101360.

2001–04 Principal Investigator for the project, “Multivariate Statistical Methodology for the Virtual Observatory”. \$1,016,289. 6/15/2001 to 5/31/2004. NSF No. DMS-0101360.

2001–02 Principal Investigator for the project, “Conference on Statistical Challenges in Modern Astronomy III”, Co-PI Eric Feigelson. \$20,000. 3/1/2001 to 2/28/2002. NSF No. DMS-0096490.

2001–02 Principal Investigator for the project, “Conference on Statistical Challenges in Modern Astronomy III”, funded by NASA. \$20,000. 3/15/2001 to 3/14/2002. No. NAG5-10542.

2001 Principal Investigator for the project, “Conference on Statistical Challenges in Modern Astronomy III”, funded by the Division of Continuing Education, Penn State University. (Program Innovation Fund) \$4,000.

2000–01 Co-Principal Investigator for the project, “Conference on Statistical Challenges in Modern Astronomy III”. \$2,000. 10/1/2000 to 12/31/2001. The Pennsylvania Space Grant Consortium.

2000-01 Scientific Computing Research Environments for the Mathematical Sciences (SCREMS), Co-P.I. - G. J. Babu. \$25,251. 9/1/2000 to 8/31/2001. NSF No. DMS-0079656.

1997–99 National Research Council’s Twinning Fellowship, for travel to Lithuania and to host Professor E. Manstavičius for a month each year. \$13,600. 9/1/1997 to 12/31/1999.

1997–99 Principal Investigator for the project, “Large Sample Methods”. \$45,503. 2/25/97 to 2/24/99. NSA No. MDA904-97-1-0023.

1996–99 Principal Investigator for the project, “Multivariate Estimation for Astronomy.” \$95,000. 8/1/96 to 7/31/99. NSF No. DMS-9626189.

1996–97 Co-principal Investigator for IAU Technical Workshop, “Conference on Statistical Challenges in Modern Astronomy II”, funded by IAU. \$1,831.95. From 4/1/96 till expended.

1995–97 Co-principal Investigator for the project, “Conference on Statistical Challenges in Modern Astronomy II”, funded by NSF. \$12,000. 6/15/95 to 5/31/97. No. DMS-9504783.

1995–96 Co-principal Investigator for the project, “Conference on Statistical Challenges in Modern Astronomy II”, funded by Continuing and Distance Education, Penn State University. (Program Development Fund) \$7,500.

1995–96 Principal Investigator for the project, “Conference on Statistical Challenges in Modern Astronomy II”, funded by International Science Foundation, New York. Supported travel for two Russians.

1995–96 Principal Investigator for the project, “Conference on Statistical Challenges in Modern Astronomy II”, funded by NASA. \$15,000. 7/1/95 TO 12/31/96. No. NAGW-4793.

1994–95 Principal Investigator for the project “Planning Visit to India”, funded by NSF. \$2,200. January 1995 to December 1995. No. INT-9419424.

1992–95 Co-principal Investigator for the project, “Multivariate and Censored Data Analysis Methods for Astronomy”, funded by NSF. 7-15-92 to 8-14-95. No. DMS-9208066.

1991 Principal Investigator for the project, “International Conference on – Statistical Challenges in Modern Astronomy”, funded by NSF. \$16,000. 1/1/91 to 12/31/91. No. DMS-9003083.

1990–1995 Co-Investigator for the project, “Multiwavelength and Statistical Research in Space Astrophysics”, funded by NASA Long-term Space Astrophysics Research Program. 6/1/90 to 5/31/95. \$120,000 per year. No. NAGW-2120.

1990–1992 Co-Principal Investigator for the project, “Advanced Statistical Methods for Analyzing Data from Astronomical Surveys”, funded by NSF. 7/1/90 to 6/30/92. \$68,450. No. DMS-9007717.

1990–1992 Principal Investigator for the project, “Edgeworth Expansions and Bootstrap”, funded by National Security Agency. \$30,000. 7/1/90 to 6/30/92. No. MDA904-90-H-1001.

1990–1992 Co-Principal Investigator for the project, “Advanced Statistical Methods for Improved Data Analysis of NASA Astrophysics Missions”, funded by NASA’s Astrophysics division. \$83,000. 2/1/90 to 1/31/1992. No. NAGW-1917.

1989–1990 Co-Principal Investigator for the project, “Mathematical Sciences Research Equipment,” funded by NSF. \$41,683. July 1989 to June 1990. No. DMS-8905785.

1988–1990 Research Associate for the project, “Applications of advanced statistical methods to satellite survey,” funded by Jet Propulsion Lab/NASA. \$27,000. No. JPL-958013.

1988–1989 Co-Principal Investigator for the project, “Evaluate Statistical designs for travel surveys and formulate pilot sampling design”, funded by Chesapeake Bay Stock Assessment Program of USDC. \$75,000. 8/1/88 to 7/31/89.

1987–1988 Co-Principal Investigator for the project, “Mathematical Statistics and Statistics for Analysis and interpretation in Marine Fisheries Research and Management”, funded by USDC. \$73,333. 3/1/87 to 8/31/88.

1987–1988 Research Director and Principal Investigator for a project funded by Chesapeake Bay Stock Assessment Program. \$50,000.

1986–1987 Co-Principal investigator, for two projects funded by NOAA. The total grant for these two projects is \$195,000.

1985–1986 Worked with the Ecology group on a grant from National Oceanic and Atmospheric Administration (NOAA).

**Doctoral Thesis Advisor to:**

Kesar Singh, 1980, Indian Statistical Institute. Professor at Rutgers University, USA.

Bhaskar Bagchi, 1983, Indian Statistical Institute. Professor at Indian Statistical Institute, Bangalore, India.

Arup Bose, 1987, Indian Statistical Institute. Professor at Indian Statistical Institute, Calcutta, India.

Regis Serinko, 1990, The Pennsylvania State University.

Kang, Hee-Jeong, 1995, Chonbuk National University, Chonju, Korea.

Mark Leeds, 2000.

James McDermott, 2003, State Street Associates in Cambridge, MA.

Hyun-sook Lee, 2006, Harvard-Smithsonian, Center for Astrophysics, Cambridge, MA.

Scott Roths, Current Ph. D. student.

**Served on Doctoral Committees:**

1986–87 Ernst Linder (Statistics) – Special Member.  
1986–87 Ken Suman (Statistics) – Special Member.  
1988–89 Ranga V. Ramasesh (Business Administration).  
1988–89 Joe Scazzero (Business Administration).  
1988–89 Gunnar Stefansson (Mathematics).  
1988–90 Zhijun Liu (Statistics).  
1988–90 Min Deng (Statistics).  
1989–90 Regis Serinko (Statistics) – Chairperson.  
1989–91 Clint Coakley (Statistics).  
1988–91 K. V. K. Prasad (Mining Engineering).  
1989–92 Venkateshwar Reddy (Finance).  
1989–92 Nandini Kannan (Statistics).  
1991–95 Hee-Jeong, 1995 (Statistics) – Chairperson.  
1996–97 Rajiv Dama (Mechanical Engineering).  
1996–99 Arthur Dryver (Statistics).  
1995–00 Mary E. Stocken (Business Administration).  
1998–00 Mark Leeds (Statistics) – Co-chair.  
2000–03 James McDermott (Statistics) – Co-advisor.  
2000–05 Srikant Vadali (Business Administration).  
2003–06 Hyun-sook Lee (Statistics) – Chairperson.  
2005–07 Derek Young (Statistics).  
2007–09 Kagan Kursungoz (Mathematics).  
2007– Arseny Egorov (Mathematics).  
2007– Scott Roths (Statistics) – Chairperson.  
2009– Day Prapanpong (Mathematics).

**Masters Theses Supervised:** Regis Serinko (1988-1989), Hyun-sook Lee (2001-2003).

**Served on Master’s Thesis Committees:** Anamagdalen Nitica (1994), Derek Young (2005).

**Undergraduate Students:** (*Research Experience for Undergraduates*) Xiao-Yi Li (BS Honors) 2003, Stas Sheynkop (BS Honors) 2004, Tae W. Kang 2004, Michael L. Rogers, 2005, and Matthew A. Lohr (BS Honors) 2006.

**College and Departmental Committees:**

Chair, Selection Committee for the John M. Chemerda Lectures in Science, 2003–2004.

Member, Eberly College of Science Strategic Vision Committee, 2004–2005.

Member, Eberly College of Science Outreach Council, 2005–Present.

Member, Eberly College of Science Sabbatical Leave Review Committee, 2006.  
Selection Committee for the John M. Chemerda Lectures in Science, 1988–1989, 1992–1993.  
Eberly College of Science Promotion and Tenure Committee, 1993–1995, 2000–2002.  
College of Science Promotion and Tenure Committees:  
    *Mathematical Sciences* (1988, 1989, 1991), and *Biological Sciences* (1990).  
Eberly College of Science Immediate Tenure committee, 1998, 2004.  
Professor-in-charge, Master of Applied Statistics Program, 2001–2007.  
Chair, Department of Statistics Promotion and Tenure Committee, 1989.  
Chair, Faculty Recruiting Committee, Department of Statistics, 1996–1997.  
Chair, Statistics Department's World Campus Program, 1998–2002.  
Chair, C.R. and Bhargavi Rao Prize selection committee, 2003, 2005, 2007, 2009.  
Chair, Awards Committee, Department of Statistics, 2004–2005.  
Chair, Fifth year post tenure evaluation committee, Department of Statistics, 2000, 2006, 2009–2010.  
Chair, Ph.D. qualifier exam committee, Department of Statistics, 2010 (Member 2009).  
Faculty Recruiting Committee, Department of Statistics, 2001–2004.  
Graduate program committee, Department of Statistics, Since 2005.

#### **University Committees:**

Chair, Committee on [Academic Standards, Graduate Council](#), Graduate Council (1997–1998, 2004–2005).  
Chair, Subcommittee on World Campus (Faculty Senate committee on outreach activities 1999–2000).  
Committee on [Academic Standards, Graduate Council](#) (1997–1999, 2003–2005).  
Executive Committee, Graduate Council (1998–1999, 2003–2005).  
Ad Hoc Committee on Professional Master's Programs, Graduate Council (2004–2005).  
Committee on Committees and Procedures, Graduate Council (1997–1999).  
Penn State Faculty Outreach Award Selection Committee (1998, 2000–2002).  
Implementation Committee on [Electronic Theses and Dissertations](#) 1998–2003.  
ETD sub-committee on Communication and Information (1999).  
Penn State [World Campus Steering Committee](#) (1998–1999, 2001–2005).  
Graduate Council's World Campus Working Group (1999).  
[Faculty Senate Committee on Outreach Activities](#) (1997–2002).  
Graduate Council Subcommittee on [Programs Review and Evaluation](#) (2000–2001).  
Penn State Review Panel on Outreach Scholarship Conference (a partnership between Penn State, the University of Wisconsin-Extension, Ohio State, and the University of Georgia, 2006).

## Organization of Conferences and Schools:

- Co-chair*, Scientific Organizing Committee for the international conference on *Statistical Challenges in Modern Astronomy*. August 11–14, 1991. This inter-disciplinary conference is cosponsored by *IMS*, *NASA* and *NSF*.
- Organized an invited paper session on *Statistics in Astronomy*, at 1993 Joint Statistical Meetings in San Francisco. Also chaired the session.
- Co-chair*, Scientific Organizing Committee for the international conference on *Statistical Challenges in Modern Astronomy II*. June 2–5, 1996. This inter-disciplinary conference is cosponsored by *IMS*, *ISI*, *IAU*, *ISF*, *NASA* and *NSF*.
- Organized an invited paper session on ‘Astrostatistics’ for International Astronomical Union at 51st session of the International Statistical Institute, August 18-27, 1997.
- Organized a session on ‘Astrostatistics’ (Track: Emerging Science: Transforming the Next Generation) at AAAS Annual meeting and science innovation exposition in Philadelphia, in February 1998.
- Organized ‘Subramanyan Chandrasekhar Memorial Session on Astrostatistics’ on August 12, 1999, Joint Statistical Meetings in Baltimore.
- Organized a session on ‘Data Mining’ in August 2000, at Joint Statistical Meetings in Indianapolis.
- Member, Organizing Committee for the International Conference in Statistics in Calcutta, India during December 29-30, 2000.
- Organized a session on ‘Resampling methods’ at the International Conference in Statistics in Calcutta, India during December 29-30, 2000.
- Member, Advisory Committee for Joint Statistical Meeting in New Delhi, India during December 30, 2000 - January 2, 2001.
- Organized a session on ‘Astrostatistics’ at the Joint Statistical Meeting in New Delhi, India during December 30, 2000 - January 2, 2001.
- Co-chair*, Scientific Organizing Committee for the international conference on *Statistical Challenges in Modern Astronomy III*. The Pennsylvania State University, July 18-21, 2001. This inter-disciplinary conference is cosponsored by *NASA*, *Penn State University* and *Pennsylvania Space Grant Consortium*.
- Member, Program Committee for the conference ‘Astronomical Data Analysis’, part of *The International Society for Optical Engineering’s* (SPIE) Symposium on Optical Science and Technology, in San Diego, 29 July - 3 August 2001.
- Member, Program Committee for the conference ‘Astronomical Data Analysis II’, part of *SPIE’s* Symposium on Astronomical Telescopes and Instrumentation, in Waikoloa, Hawaii, 22 - 28 August 2002.
- Member, Scientific Organizing Committee at for the conference *Astronomical Data Analysis- III*, in Sant’ Agata sui due Golfi (NA), Italy, 29 April to 1 May 2004.
- Organized a session on ‘Astrostatistics’ at the International Conference on the *Future of statistical theory, practice and education*, at Hyderabad, India. December 29, 2004 - Jan 1, 2005.

Organized a *Summer School in Statistics for Astronomers and Physicists* at Penn State, during June 5-17, 2005.

Organized a *SAMSI Astrostatistics program planning meeting* at NASA Ames Center during July 14-15, 2005.

Chair of the Program Leaders Committee, and directed a semester long *Astrostatistics program* at SAMSI during January - May 2006.

Organized *Tutorials* for astronomers and statisticians at SAMSI (January 18-22, 2006).

Organized the *Opening Workshop* to focus on the scientific agenda of the Astrostatistics program at SAMSI (January 23-25, 2006).

Organized the second *Summer School in Statistics for Astronomers and Physicists* at Penn State, during June 6-10, 2006.

Co-Chair, Scientific Organizing Committee for ‘Statistical Challenges in Modern Astronomy IV’, held at Penn State University during June 12-15, 2006.

Member, Scientific Organizing Committee for *Astronomical Data Analysis IV*, held at Laboratoire d’Astrophysique deMarseille, Marseille, France, during September 18-20, 2006.

Organized the third *Summer School in Statistics for Astronomers* at Penn State, during June 4-9, 2007.

Organized a *Summer School in Statistics for Astronomers*, in collaboration with *The Indian Institute of Astrophysics, Bangalore*, at the Vainu Bappu Observatory near the village of Kavalur in India, during July 2-7, 2007.

Member, Scientific Organizing Committee for *Astronomical Data Analysis V*, Heraklion, Crete (Greece), during May 7-9, 2008.

Organized the fourth *Summer School in Statistics for Astronomers* at Penn State, during June 9-14, 2008.

Organized the second *Summer School in Statistics for Astronomers*, in collaboration with *The Indian Institute of Astrophysics, Bangalore*, at the Vainu Bappu Observatory near the village of Kavalur in India, during July 9-16, 2008.

Member, Scientific Organizing Committee for *III INPE Advanced Course on Astrophysics: Astrostatistics*, to be held at Sao Jose dos Campos-SP, Brazil, during September 14-18, 2009.

Member, Scientific Organizing Committee for *ADA VI – Astronomical Data Analysis*, conference in Honor of Albert Bijaoui, to be held at Monastir, Tunisia, during May 3-6, 2010.

### **Invited Conferences:**

On a grant from International Mathematical Union, attended the *International Congress of Mathematicians* at Helsinki, Finland in August 1978.

Oberwolfach Conference on *Analytic Number Theory* in November 1980 in West Germany.

Fourth Annual Conference of the *Indian Society for the Theory of Probability and its Applications* held at Indian Institute of Management, Calcutta in June 1983.

Fourth Mathscience Conference on *Number Theory*, held at Ooty, India. December, 1984.

Special Symposium on U. S. National *Monitoring Strategies*. Oceans 86. Washington D.C., during September 23–25, 1986.

ASA and EPA Conference on *Statistical Issues in Combining Environmental Studies*, at Washington D.C., during October 1-2, 1986.

AMS/SIAM/IMS Summer Research Conference on *Statistical Analysis of Measurement Error Models and Applications*, held at Humboldt State University during June 10–16, 1989.

International Conference on Recent Developments in *Statistical Data Analysis and Inference* held at the University of Neuchâtal, Switzerland, during August 21–24, 1989. *Chaired a Session.*

*Statistics '91 Canada*, Third Canadian Conference in Applied Statistics held at Concordia University, Montreal, Canada. May 23 - May 25, 1991.

International conference on *Analytic and Probabilistic Methods in Number Theory* at Palanga, Lithuania, USSR. September 24-28, 1991. (Presented an Invited paper, could not attend due to political unrest in USSR.)

Some Recent Contributions to Edgeworth Expansions. An invited talk presented at *Probability Day* at Penn State University. July 15, 1991.

First International Triennial Calcutta Symposium on *Probability and Statistics* at Calcutta University, India. December 27, 1991 to January 1, 1992.

Statistics in Astronomy. (With Eric Feigelson). Invited talk presented at 1993 Joint Statistical Meetings in San Francisco on August 11, 1993.

Bootstrap and other Resampling Methods. An invited talk presented at *Bootstrap Day* at Penn State University. November, 12, 1994.

Bootstrap and other resampling schemes. A 90 minute invited talk on given at *NSF Summer Symposium on the Bootstrap 1996* at Econometrics Laboratory, University of California at Berkeley. July 30 - August 6, 1996.

Conjecture by Erdős and additive functions on the set of pairs of integers. Invited talk given on September 24, 1996 at *II International Conference on Analytic and Probabilistic Number Theory* organized by Vilnius University during September 23-27, 1996 at Palanga, Lithuania, to honor Professor Jonas Kubilius on his 75th birthday.

The resurgence of astrostatistics. Invited talk at *51st session of the International Statistical Institute* at Istanbul, 18-26 August 1997. The session on Astrostatistics is sponsored by International Astronomical Union.

Conditional Edgeworth Expansions and Resampling Schemes. Invited talk at *85th Session of the Indian Science Congress*, Osmania University, Hyderabad, India, January 3-7, 1998.

Asymptotic theory for random permutations with applications to genetics. Invited talk at 1998 Lukacs Symposium, *Statistics for the 21st Century*, Bowling Green University, April 24-26, 1998.

Comparison of Resampling Procedures. Invited talk at *Rutgers Bootstrap Conference*, May 14-16, 1998.

Breakdown theory for estimators based on bootstrap and other resampling schemes. Invited talk

- at *IISA International conference 1998*, McMaster University, Hamilton, Canada, October 10-11, 1998.
- Random Permutations and the Ewens sampling formula in genetics, at the International conference on *Combinatorics, Statistics, Pattern Recognition and Related Areas*, Mysore, India, on December 29, 1998.
- Limit Theorems for Random Permutations, at the conference, *Paul Erdős and his Mathematics*, Budapest, Hungary July 4-11, 1999.
- Functional Limit Theory for processes generated by random permutations. Invited talk at *Workshop on the Interface of Probability and Number Theory*, University of Illinois at Urbana-Champaign, May 19-20, 2000.
- Statistical methodology for NVO. Invited talk at the *Conference on Virtual Observatories of the Future*, Caltech, June 13 - 16, 2000.
- Statistical Methodology for NVO. ESO/ESA/NASA/NSF Astronomy Conference, *Toward an International Virtual Observatory*, June 10 - 14, 2002, Garching, Germany.
- Goodness-of-fit tests when parameters are estimated. Special invited lecture at the *Fourth Biennial International Conference on Statistics, Probability and Related Areas*, June 14-16, 2002, Northern Illinois University in DeKalb, Illinois.
- Statistical methodology for massive datasets and model selection, *Astronomical Data Analysis II (ADA)*, part of SPIE Symposium on Astronomical Telescopes and Instrumentation, in Waikoloa, Hawaii, 22-28 August 2002.
- Invited participant at the ‘Workshop on Statistical methods for the analysis of massive streams of data’, organized by the National Academies’ Committee on Applied & Theoretical Statistics. National Academies Building, Washington, D.C. December 13-15, 2002.
- Statistical and computational challenges, and opportunities in Astronomy. Invited talk at *International Conference on Ranking and Selection, Multiple Comparisons and Reliability, and Their Applications*, December 28-30, 2002, Chennai, India
- Goodness of fit tests with estimated parameters. Invited talk at *XXIII International Seminar on Stability Problems for Stochastic Models*, May 12-17, 2003, Pamplona, Spain.
- Statistical challenges in Modern Astronomy (with E. Feigelson). Invited presentation at *International Conference on Advanced Statistical Methods in Particle and Astro-Particle Physics*, September 8-12, 2003, SLAC, Stanford, CA.
- Probabilistic Number Theory and Random Permutations: Functional Limit Theory. Invited presentation at *Conference on Zeta Function*, December 13-15, 2003, National Institute of Advanced Studies (NIAS), Bangalore, India.
- Model fitting in the presence of nuisance parameters. Invited presentation at the conference *Astronomical Data Analysis-III*, Sant’ Agata sui due Golfi (NA), Italy, 29 April to 1 May 2004.
- Invited participant at the *Statistical Issues in Data Acquisition*, organized by the National Academies’ Committee on Applied & Theoretical Statistics. Lawrence Berkeley National Laboratory, Berkeley, July 16, 2004. [http://sites.nationalacademies.org/DEPS/BMSA/DEPS\\_047678](http://sites.nationalacademies.org/DEPS/BMSA/DEPS_047678).

Statistical Challenges in Modern Astronomy. Invited presentation at International Conference on *Recent developments in statistics and their applications*, Tirupati, India. January 3-4, 2005.

Invited participant at *Statistics for Gravitational Wave Data analysis* workshop, Penn State. May 19-21, 2005.

Weak convergence for additive functions on random partitions of an integer. Invited speaker at the international conference on *Probability and Number partitions Theory*, Kanazawa, Japan. June 20-24, 2005.

Goodness-of-fit and all that! Invited speaker at *ADASS IV - Astronomical Data Analysis Software & Systems XV*, San Lorenzo de El Escorial, Spain. October 2-5, 2005.

Tutorial. R: A powerful public software environment for statistical analysis of astronomical data. (with David Hunter, Eric Feigelson). 170 participants

Statistical Problems in Astronomy (December 21, 2005).

Resampling Techniques (December 22, 2005). Invited speaker at the *Workshop on Astrostatistics*, Calcutta University, Kolkata, India, December 21-23, 2005.

Invited Discussant at *Statistical Challenges in Modern Astronomy IV*, Penn State University, June 12-15, 2006

Object detection in multi-epoch data. Invited speaker at *Astronomical Data Analysis IV*, Laboratoire d'Astrophysique deMarseille, Marseille, France. September 18-20 2006.

Invited participant at the *Phystat-LHC Workshop on Statistical issues for LHC Physics*, CERN, Geneva, June 27-29, 2007.

Marginal quantiles: Asymptotics for functions of order statistics. Invited speaker at the conference on *Recent Advances in Probability* held at the Indian Statistical Institute, Calcutta. December 11-15, 2007. Part of Platinum Jubilee celebration of the Indian Statistical Institute.

Invited participant at *The LSST All-Hands Meeting*, the National Center for Supercomputing Applications, University of Illinois, Urbana-Champaign, May 19-23, 2008.

Edgeworth expansions and their applications. Invited speaker at the conference on *Advances in Statistics*, held in honor of the 65th birthday of Zhidong Bai at National University of Singapore, July 20, 2008.

Understanding 21st Century Astronomical Data Cubes. Invited speaker at the IJCAI-09 Workshop on *Machine Learning and AI Applications in Astrophysics and Cosmology*, Pasadena, California, July 16-17, 2009.

### **Invited Talks:**

International institutions, where invited talks are given include: University of Oslo (Norway), University of Lund (Sweden), University of Copenhagen (Denmark), Mathematical Institute of Paderborn (West Germany), University of Szeged (Hungary), Andhra University (India), Monash University (Australia), Melbourne University (Australia), Latrobe University (Australia), Australian National University (Australia), Indian Statistical Institute, (Kolkata, India), Keio University (Japan), Institute of Statistical Mathematics (Japan), Hiroshima University (Japan), Osaka city University (Japan), National Sun Yet-sen University (Taiwan), Concordia University

(Canada), University of Hyderabad (India), University of Poona (India), Inter-University Centre for Astronomy and Astrophysics (India), National University of Singapore (Singapore), National Tsing Hua University (Taiwan), Institute of Statistical Science, Academia Sinica (Taiwan), LAMOST project of National Astronomical Observatory of the Chinese Academy of Sciences (Beijing, China), Northeast Normal University (Changchun, China), Indian Institute of Astrophysics (Bangalore, India), Raman Research Institute (Bangalore, India), and other universities and institutes.

Institutions in the USA, where invited colloquia talks are given include: Rutgers University, University of Pennsylvania, University of Maryland at Baltimore County, Michigan State University, Case Western Reserve University, Mathematical Sciences Research Institute (Berkeley), University of Georgia, Florida State University, Purdue University, Iowa State University, Ohio State University, Wright State University, Texas A&M university, Statistical and Applied Mathematical Sciences Institute (Research Triangle Park, North Carolina), North Carolina State University, University of South Carolina, University of Minnesota, University of California at Irvine, The Pennsylvania State University (Department of Industrial and Manufacturing Engineering), University of Texas at Dallas, Columbia University (New York), and other universities and institutes.

## List of Research Publications of G. J. Babu

The numbers following **MR** denote the *Mathematical Reviews* numbers.

### Books Published:

1. Babu, G. J., and Feigelson, E. D. (Editors) (2007). *Statistical Challenges in Modern Astronomy IV*. ASP Conference Series, Vol. 371, Astronomical Society of the Pacific, San Francisco.
2. Feigelson, E. D., and Babu, G. J. (Editors) (2003). *Statistical Challenges in Astronomy*. Springer-Verlag, New York.
3. Babu, G. J., and Feigelson, E. D. (Editors) (1997). *Statistical Challenges in Modern Astronomy II*. Springer-Verlag, New York.
4. Babu, G. J., and Feigelson, E. D. (1996). *Astrostatistics*. Chapman and Hall, London. Reprinted (1997).
5. Feigelson, E. D., and Babu, G. J. (Editors) (1992). *Statistical Challenges in Modern Astronomy*. Springer-Verlag, New York.
6. Babu, G. J. (1978). *Probabilistic Methods in the Theory of Arithmetic Functions*. Macmillan Lecture Series, Series 2, New Delhi. (**MR** #80g: 10057).

### Research Publications:

1. Babu, G. J., Chattopadhyay, T., Chattopadhyay, A., and Mondal. S. (2009). Horizontal branch morphology of globular clusters: A multivariate statistical analysis. *The Astrophysical Journal*, **700**, 1768-1778.
2. Babu, G. J. (2009). Marginal quantiles: Asymptotics for functions of order statistics. In *Perspectives in Mathematical Sciences I: Probability and Statistics*. Statistical Science and Interdisciplinary Research, **Vol. 7**. World Scientific Publishing Co., 31-39.
3. Babu, G. J., Mahabal, A., Williams, R., and Djorgovski, S. G. (2008). Object detection in multi-epoch data. *Statistical Methodology*, **5**, issue 4, 299-306. [Slides]
4. Babu, G. J. (2008). Edgeworth Expansions: A brief review of Zhidong Bai's contributions. In *ADVANCES IN STATISTICS*, Zehua Chen, Jin-Ting Zhang & Feifang Hu (Eds.). World Scientific Publishing Co, 16-18.
5. Babu, G. J., and Padmanabhan, A. R. (2007). Re-sampling methods for testing for location against unrestricted and ordered alternatives. *Journal of Statistical Planning and Inference*, **137**, issue 11, 3261-3267.
6. Babu, G. J., Manstavičius, E., and Zacharovas, V. (2007). Limiting processes with dependent increments for measures on symmetric group of permutations. *Advanced Studies in Pure Mathematics*, **49**, 41-67.

7. McDermott, J. P., Babu, G. J., Liechty, J. C., and Lin, Dennis K. J. (2007). Data skeletons: simultaneous estimation of multiple quantiles for massive streaming datasets with applications to density estimation. *Statistics and Computing*, **17**, issue 4, 311-321.
8. Babu, G. J., and Mahabal, A. (2007). Using R-based VOSTat as a low-resolution spectrum analysis tool. *Journal of Statistical Software*, **18**, issue 11, 1-12.
9. Babu, G. J. (2006). Probabilistic Number Theory and Random Permutations: Functional Limit Theory. In *The Riemann Zeta function and related themes*, R. Balasubramanian and K. Srinivas (eds.). Ramanujam Mathematical Society – Lecture Notes Series, No. 2, 19-27.
10. Babu, G. J., and Chaubey, Y. P. (2006). Smooth estimation of a distribution and density function on hypercube using Bernstein polynomials for dependent random vectors. *Statistics and Probability Letters*, **76**, no. 9, 959-969.
11. Babu, G. J., and Djorgovski, S. G. (2004). Some statistical and computational challenges, and opportunities in astronomy. *Statistical Science*, **19**, no. 2, 322-332. (MR #2005j: 37136).
12. Babu, G. J., and Rao, C. R. (2004). Goodness-of-fit tests when parameters are estimated. *Sankhyā*, **66**, no. 1, 63-74. (MR #2005c: 62053).
13. Babu, G. J. (2004). A note on the bootstrapped empirical process. *J. of Statistical Planning and Inference*, **126**, no. 2, 587-589.
14. Babu, G. J., Boyarsky, A., Chaubey, Y. P. and Gora, P. (2004) New statistical method for filtering and entropy estimation of a chaotic map from noisy data. *International Journal of Bifurcation and Chaos*, **14**, no. 11, 3989-3994.
15. Babu, G. J., Jogesh, and Rao, M. Bhaskara. (2004). Occurrence/exposure rate. In *Encyclopedia of Actuarial Science*, Bjoern Sundt and Jef Teugels (Eds.), Wiley, Chichester, Vol **3**, 1199-1201.
16. Babu, G. J., and Rao, C. R. (2003). Confidence limits to the distance of the true distribution from a misspecified family by bootstrap. *J. Statistical Planning and Inference*, **115**, no. 2, 471-478. (MR #2004c: 62072).
17. Scargle, J. D., and Babu, G. J. (2003). Point processes in astronomy: Exciting events in the universe. *Handbook of Statistics*, Vol. **21** “Stochastic Processes: Modeling and Simulation.” C. R. Rao and D. N. Shanbhag (Eds.), Elsevier Science Publishers B. V., Amsterdam, 795-825.
18. Babu, G. J., Singh, K., and Yang, Y. (2003). Edgeworth expansions for compound poisson processes and the bootstrap. *The Annals of the Institute of Statistical Mathematics*, **55**, no. 1, 83-94. (MR #2004b: 62084).
19. Babu, G. J., and Padmanabhan, A. R. (2002). Re-sampling methods for the nonparametric Behrens-Fisher problem. *Sankhyā*, Series A, **64**, 678-692.

20. Babu, G. J., and Manstavičius, E. (2002). Infinitely divisible limit processes for the Ewens sampling formula (Russian). *Lietuvos Matematikos Rinkinys*, **42**, no. 3, 294-307. English translation in *Lithuanian Math. J.*, **42**, no. 3, (2002), 232-242. (MR #2003k: 60044).
21. Babu, G. J., and Manstavičius, E. (2002). Limit processes with independent increments for the Ewens sampling formula. *The Annals of the Institute of Statistical Mathematics*, **54**, no. 3, 607-620. (MR #2003j: 60041).
22. Babu, G. J., Canty, A., and Chaubey, Y. (2002). Application of Bernstein Polynomials for Smooth Estimation of a Distribution and Density Function. *J. Statistical Planning and Inference*, **105**, no. 2, 377-392. (MR #2003d: 62088).
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26. Babu, G. J. (1999). Breakdown theory for estimators based on bootstrap and other re-sampling schemes. In *Asymptotics, Nonparametrics, and Time Series*. Subir Ghosh (Ed.). Marcel Dekker, New York, 669-681.
27. Babu, G. J., Padmanabhan, A. R., and Puri, M. L. (1999). Robust one-way ANOVA under possibly non-regular conditions. *Biometrical Journal*, **41**, 321-339. (MR #2000d: 62108).
28. Babu, G. J., and Manstavičius, E. (1999). Random permutations and the Ewens sampling formula in genetics. *Probability and Mathematical Statistics*. B. Grigelionis *et al.* (Eds.), TEV, Vilnius and VSP, Utrecht, Netherlands, pp 33-42.
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39. Serinko, R. J., and Babu, G. J. (1995). Asymptotics of k-mean clustering under non-i.i.d. sampling. *Probability and Statistics Letters*, **24**, 57-66. (MR #96d: 62108).
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51. Babu, G. J. (1992). Smoothness of the distributions of arithmetic functions. *New Trends in Probability and Statistics*, Vol 2. Analytic and Probabilistic Methods in Number Theory. F. Schweiger and E. Manstavičius (Eds.); TEV, Vilnius and VSP, Utrecht, Netherlands, 191-199. (MR #93m: 11079).
52. Babu, G. J., and Feigelson, E. D. (1992). Analytical and Monte Carlo comparisons of six different linear least squares fits. *Communications in Statistics - Simulation and Computation*, **21** (2), 533-549. (MR #93e: 62167).
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55. Babu, G. J. (1991). Edgeworth expansions for statistics, which are functions of lattice and non-lattice variables. *Statistics and Probability letters*, **12**, 1-7. (MR #92k: 62027).
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66. Babu, G. J. (1989). Applications of Edgeworth expansions to bootstrap – A review. *Statistical Data Analysis and Inference*, Y. Dodge (Ed.), Elsevier science publishers B. V., Amsterdam, 223-237. (MR #91m: 62076).
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83. Deo, C. M., and Babu, G. J. (1981). Probabilities of moderate deviations in a Banach space. *Proceedings of the American Mathematical Society*, **83**, 392-397. (MR #83a: 60044).
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85. Babu, G. J. (1980). On the distribution of multiplicative functions. *Acta Arithmetica*, **36**, 331-340. (MR #82a: 10060).
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93. Erdős, P., Babu, G. J., and Ramachandra, K. (1977). An asymptotic formula in additive number theory—II. *J. Indian Math. Soc.*, **41**, 281-291. (MR #81g: 10062).
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**Papers in conference proceedings and books:**

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