

# Curriculum Vitae

## 1. PERSONAL:

**Name :** Tapasi Ghosh

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**Date and Place of Birth :** 13 November 1959, Calcutta, India.

**Nationality :** Indian

**Marital Status :** Married, with a twelve-year old daughter.

**Fluency in Languages other than English:** My mother tongue is Bengali (one of the official languages in India), although I have been using English for more than 30 years and most of my formal education has been in English. In addition, I have a limited command of Spanish, and a brief exposure to Dutch.

## 2. EDUCATION:

B.Sc. Physics (Hons)	Lady Brabourne College, Calcutta, India.	1979
M.Sc. Physics	University College of Science, Calcutta, India.	1981
Post M.Sc Associate (Bio-Physics)	Saha Inst. of Nuclear Phys., Calcutta, India.	1982-83
Ph.D (Astronomy)	Indian Inst. of Science, Bangalore, India. Thesis Topic: "Low-Frequency Variability of Compact Extragalactic Radio Sources"	1990

## 3. EMPLOYMENT:

- Dec 1990 – Nov 1992: Post-doctoral Fellow, Netherlands Foundation for Research in Astronomy, Dwingeloo, The Netherlands.
- Dec 1992 – Dec 2004: Research Associate, NAIC, Arecibo Observatory.
- Dec 2004 – Present: Senior Research Associate, NAIC, Arecibo Observatory.

## 4. AREAS OF EXPERTISE/RESPONSIBILITIES:

I have been a Staff Scientist at the NAIC's Arecibo Observatory since 1992. My job title is "Senior Research Associate", which has a different connotation within NAIC/Cornell University to that with which it is generally understood. In this position, 50% of one's time is allocated for service work, observing support and supervision of summer students, while the other 50% is for one's own research.

Most of my own research has been focussed on radio astronomy related programs. I have pursued a range of studies (line and continuum) of Active Galactic Nuclei and their hosts, radio wave propagation through the Interstellar Medium, and technical issues of Very Long Baseline Interferometry and Radio Frequency Interference.

My on-going research plan is discussed in a separate document, and in the following I detail my service activities at Arecibo.

## 5. SERVICE WORK AT ARECIBO OBSERVATORY:

- **Equipment tests and commissioning support:** During the commissioning phases of the two major construction work at the Arecibo Observatory since I joined, (i.e. the Gregorian upgrade between 1993 - 1998, and the ALFA multifeed receiver installation in 2004), I have worked with a team of astronomers in characterizing the telescope and its equipment.

- **VLBI-related work:** I am an active member of the Arecibo VLBI group. Following the completion of the Telescope Upgrade in 1998, we participated in global space VLBI (43 runs) with the Japanese VSOP orbiting antenna, HALCA, using a Canadian S2 recorder system.

In late 1996, Chris Salter and I prepared a proposal to the NSF Major Research Instrumentation (MRI) Program for the purchase of a broad-band VLBA-4 recorder and associated hardware for Arecibo. The proposal was successful in securing funding of about US \$ 500,000.00. In 2004, the observatory acquired a MK5A disk-based recording system. I was involved in the testing/commissioning of both of these systems.

With support from Drs. Chris Salter and Emmanuel Momjian, I have been carrying out Global, EVN, HSA, and e-VLBI observations routinely (see, <http://www.naic.edu/~astro/aovlbi>).

- **Spectrum Management and RFI-protection related work:** Until April 2001, I was responsible for coordinating the local activities of the Spectrum Management and RFI-protection Group (SMARG) at Arecibo. This required working with a 10-member team consisting of engineers, software personnel, scientific staff and telescope operators to ensure that the radio-spectrum allocated to radio astronomy is maintained interference free and protected at Arecibo. This entailed minimizing emissions from on-site equipment, monitoring the wider radio environment, searching for sources of interference using a mobile unit, and liaison work with local spectrum users, both civil and military authorities, in cases of complaints.
- **Visiting Observer Support:** As well as running VLBI observations, I have been the friend-of-the-telescope for a large number of spectral line projects since the completion of the Arecibo upgrade seven years ago.
- **NAIC/AO Newsletter:** Between Mar 1994 – Feb 2000, and again between Nov 2001 – Jul 2004, I was the co-editor of the “AO/NAIC Newsletter”. This is published approximately three times per year. This work involved me in planning, editing and producing the Newsletter and helped me gain desk-top publishing expertise.

- **Teaching-related experience:**

Along with Dr. Chris Salter, I supervised the PhD thesis of José Francisco Salgado from the University of Michigan (April 2000) with Thesis Title: “The Distribution of Galactic Scattering Material in the Longitude Range  $30^\circ < l < 77^\circ$ ”.

I have supervised the following undergraduate summer students between 1993 and 2006 (in NSF’s REU Program). I include a list of their project titles.

- 2006: Maria Ximena Fernandez (Vassar College, NY), “A Radio Spectral Line Study of the 2-Jy IRAS-NVSS Sample” Co-Is: Emmanuel Momjian, Chris Salter (NAIC)
- 2005: Laura Kushner (Univ. of Washington, Seattle), “An Unbiased Search for Damped Lyman Alpha Absorbers using the HI 21-cm line”, Co-Is: Chris Salter (NAIC), Karen O’Neil (NRAO)

- 2003: Kit Reilly (deceased, New College, Fl.), “Continuum Mapping of the North Polar Spur”, Co-I: Chris Salter (NAIC)
- 2002: Samantha Stevenson (Wesleyan College), “Evolutionary Tracks of 12-micron Sample Seyfert Galaxies”, Co-Is: JoAnn Eder (NAIC), Leslie Hunt (Arcetri, Italy)
- 2001: SunMi Chung (Wesleyan College), “PKS1004+13: The Rosetta Stone for BAL Quasars?”, Co-I: Chris Salter (NAIC)
- 1999: Dargan Frierson (North Carolina State University) “HI spectra of Seyfert Galaxies and testing the Unification Scheme”. Co-Is: Jo Ann Eder (NAIC) and Chris Salter (NAIC).
- 1998: Monique Aller (Wellesley) “A Search for High Redshift Hydrogen Absorption in Radio-Loud Quasars”. Co-Is: Mike Davis (SETI Inst.), Chris Salter (NAIC).
- 1998: Dale Kocevski (Univ. of Michigan) “The RFI Environment as seen by the Gregorian L-band Receiver.” With Co-I: Jo Ann Eder (NAIC)
- 1997: Francisco Acevedo (Embry-Riddle College, Florida), “Measurement of the Electromagnetic and Radio Frequency Interference (EMI and RFI) at Key Locations within the Observatory”.
- 1996: Cesar Tavaréz (Univ. of Mayaguez, Puerto Rico), “Analysis of Radio Frequency Interference Monitoring Data collected round the Clock at Arecibo Observatory”.
- 1995: Evan Jones (SMSU, USA), “On the Environmental Triggering of Radio Emission in Seyfert Galaxies”.
- 1994: Deepa Iyengar (Carleton College, USA), “VLBI imaging of the scatter-broadening of compact extragalactic radio sources seen through the plane of the Galaxy”.
- 1993: Ben Oppenheimer (Columbia Univ, NY), “Refractive interstellar scintillations of the pulsar, PSR 1933+16”. Co-I: Chris Salter (NAIC)

I have also lectured on “Radio Galaxies and Quasars”, “Energy Generation Mechanisms in Astronomical Sources”, “AGNs”, and “Radio Interferometry” to the AO summer students between 1993 and 2005, and helped in the organizing and running of three NAIC/NRAO Single-dish Summer Schools in 2001, 2003, and 2005.

- **Software and data reduction experience :**

Since 1983, I have been using Fortran as my basic programming language. I have worked with PDP, Alliant, Vax/VMS, Unix, Linux, Solaris and Mac OSX operating systems. I am also familiar with a variety of word processing and desk-top publishing software (both Windows and Apple-Macintosh based). I am conversant with html-based web-page developments. Over the years, I have used various radio astronomical data analysis packages both for single dish and interferometers. I have been using IDL quite extensively over the last five years, often writing special application codes.

- **Other academic experience:** I have reviewed papers submitted to ApJ and Radio Science, and served on Grant Proposal review committees conducted by the National Science Foundation of the USA. I am a member of the International Astronomical Union and the American Astronomical Society.

## 6. PUBLICATIONS:

1. Gopal-Krishna, Ghosh, T. and Saripalli, L. “CERCO” - A Compendium of Extragalactic Radio sources, Catalogues and Observations”, 1985, circulated from Tata Institute of Fundamental Research, India.

2. Gopal-Krishna, Steppe, H., Ghosh, T. and Saripalli, L., "A statistical analysis of the radio properties of a large sample of 374 optically selected quasars". 1986, IAU Symp. 119, p. 111.
3. Ghosh, T. and Rao, A. P., "The Galactic Coordinate Dependence of Metre Wavelength Variability" 1987, Bull. Astr. Soc. India., 15, 40.
4. Ghosh, T. and Rao, A. P., "Observations of low frequency variables at Ooty", 1987, NRAO Workshop No. 20: Large-scale Surveys of the Sky, p.43.
5. Ghosh, T. and Gopal-Krishna. "A multifrequency study of radio intensity variations for active galactic nuclei of different optical classes", 1990, A&A 230, 297.
6. Saikia, D. J., Salter, C. J., Banhatti, D.G., Ghosh, T., Gothoskar, P. and Manoharan, P.K., "The Ooty Summer Training Program 1990", 1991, Bull. Astr. Soc. India., 19, 109.
7. Ghosh, T. and Rao, A. P., "The Galactic latitude dependence of Low Frequency Variability of extragalactic radio sources", 1992, A&A 264, 203.
8. Kukula, M. J., Ghosh, T., Pedlar, A., Schilizzi, R. T., Miley, G. K., deBruyn, A. G., Saikia, D.J., "High resolution radio observations of Markarian 3", 1993, MNRAS 264, 893.
9. Oppenheimer, B.R., Salter, C.J., Biggs, J., Foster, R., Ghosh, T. "Monitoring the interstellar scintillations of PSR 1933+16 : Eight epochs from Jan 1992 to May 1993", 1993, BAAS, 25, 1358.
10. Ghosh, T., Schilizzi, R. T., Miley, G. K., deBruyn, A. G., Kukula, M. J., Pedlar, A., Graham, D., Saikia, D. J., "The milliarcsecond structure of four Seyfert galaxies at  $\lambda 18$  cm.", 1993, Proc. IAU Symp. 159 on Active Galactic Nuclei across the electromagnetic spectrum, Ed: Blecha, A., and Courvoisier, T. (Kluwer Academic Publishers, 1994), p426.
11. Ghosh, T., Gopal-Krishna, and Rao, A. P., "Three year monitoring of a sample of flat-spectrum radio sources at 327 MHz", 1994, A&A S, 106, 29
12. Iyengar D.R., Ghosh, T., Salter, C.J., "Modeling the distribution of interstellar scattering at low latitudes", 1994, BAAS, 26, 1328.
13. Altschuler, D.A., Salgado, J.F., Dennison, B.K., Ghosh, T., "Variability of extragalactic radio sources at low frequencies", 1994, BAAS, 26, 1503.
14. Jones, E.J., Ghosh, T., "Radio-loud Seyfert Galaxies and their Environments", 1995, BAAS, 27, 1355.
15. Acevedo, F., Ghosh, T., "Radio Frequency Interference: Radio Astronomy's Biggest Enemy" 1997, BAAS, 191, 1101.
16. Salgado, J.F., Ghosh, T., Salter, C.J., Junor, W., Manoharan, P.K., 1997, I.A.U. Coll. No. 164, "Radio Emission from Galactic and Extragalactic Compact Sources", Astronomical Society of the Pacific Conference Series, Volume 144, eds. J.A. Zensus, G.B. Taylor, & J.M. Wrobel, P287.
17. Eder, J., Ghosh, T., Kocevski, D.D., "Dealing with the RFI Environment at Arecibo Observatory" 1998, BAAS, 193, 1118.
18. Salter, C.J., Ghosh, T., et al., "Single-Epoch Measurements of Broadband Radio Continuum Spectra", 1998, BAAS, 193, 107225.
19. Salgado, J.F., Salter, C.J., Ghosh, T., Manoharan, P.K., "Towards an Understanding of the Galactic Distribution of Electron-Density Fluctuations", 1998, BAAS, 30, 1341.
20. Salter, C.J., Ghosh, T., Alejandro, A., Aller, M.C., Cordero, Y., Daubar, I., DeDeo, S., Kaplan, D.L., Kocevski, D.D., Mercado, F. A., Oppenheimer, B.D., Salmeron, C., "Single Epoch Measurements of Broadband Radio Continuum Spectra", 1998, BAAS, 30, 1414.

21. Salgado, J.F., Salter, C.J., Ghosh, T., Junor, W., Manoharan, P.K., "A Study of the Distribution of Galactic Scattering Material in the Longitude Range  $30^\circ \leq l \leq 75^\circ$ ", 1999, BAAS, 31, 1373.
22. Frierson, D.M., Ghosh, T., Salter, C., Eder, J., "Neutral Hydrogen in Seyfert Galaxies – A Test for the Unification Scheme", 1999, BAAS, 195, No.115.14.
23. Kukula, M., Ghosh, T., Pedlar, A., Schilizzi, R.T. "Parsec-Scale Structures in the Nuclei of Four Seyfert Galaxies" 1999, ApJ, 518, 117.
24. Salgado, J.F., Ghosh, T., Altschuler, D.R., Dennison, B.K., Mitchell, K.J., Payne, H.E., "14-year Program Monitoring the Flux Densities of 33 radio sources at low frequencies". 1999, ApJ Suppl. 120, 77.
25. Ghosh T., Eder J.A., Salter C.J., Frierson, D.M., 2000, "Neutral Hydrogen in Seyfert Galaxies - A Test for the Unification Scheme", ASP Conference Series; "Gas and Galaxy Evolution", eds. J.E. Hibbard, M. Rupen, J.H. van Gorkom.
26. Hirabayashi et al. "The VSOP 5 GHz AGN Survey I. Compilation and Observations". 2000, PASJ, 52, 997.
27. Molotov, I.E., Chuprikov, A.A., Salter, C.J., Ghosh, T., "The possibility for collaboration of Arecibo with international S2 ad-hoc array". 2001, BAAS, 33,899.
28. Salter, C.J., Ghosh, T., "Arecibo Spectral Baselines in the Presence of Continuum Emission". 2001, BAAS, 33, 900.
29. Kanekar, N., Ghosh, T., Chengalur, J.N., "Detection of a multi-phase ISM at  $z= 0.2212$ ", 2001, A &A, 373, 394.
30. Heiles, C., Perillat, P., Nolan, M., Lorimer, D., Bhat, N.D.R., Howell, E., Ghosh, T., Lewis, M., O'Neil, K., Salter, C., and Stanimirovic, S., "All Stokes Parameterization of the Main Beam and First Sidelobe for the Arecibo Radio Telescope", 2001, PASP, 113, 1247.
31. Heiles, C., Perillat, P., Nolan, M., Lorimer, D., Bhat, N.D.R., Howell, E., Ghosh, T., Lewis, M., O'Neil, K., Salter, C., and Stanimirovic, S., "Mueller Matrix Parameters for Radio Telescopes and Their Observational Determination", 2001, PASP, 113, 1274.
32. Ghosh, T., Davis, M. M., Salter, C.J., and Aller, M.C., "An HI Search for the Host Galaxies of 27 Radio-Loud AGNs at  $z \leq 2.3$ ", 2001, I.A.U. Symp. No. 199, 127.
33. Ghosh, T., "Spectrum Management", ASP Conference Series; "NAIC/NRAO School on Single-Dish Radio Astronomy: Techniques and Applications", eds. S. Stanimirovic, D.A. Altschuler, P.F. Goldsmith, C.J. Salter, 2002, 447.
34. Ghosh, T., Salter, C.J., 2002, "Arecibo Spectral Baselines in the Presence of Continuum Emission", ASP Conference Series; "NAIC/NRAO School on Single-Dish Radio Astronomy: Techniques and Applications", eds. S. Stanimirovic, D.A. Altschuler, P.F. Goldsmith, C.J. Salter, 2002, 52
35. Molotov, I., Chuprikov, A., Likhachev, S., Salter, C.J., Ghosh, T., Ghigo, F., Dougherty, S., 2002, "First VLBI Observations with Arecibo in an International S2 Ad-hoc Array", ASP Conference Series; "NAIC/NRAO School on Single-Dish Radio Astronomy: Techniques and Applications", eds. S. Stanimirovic, D.A. Altschuler, P.F. Goldsmith, C.J. Salter, 2002, 507.
36. Stevenson, S.L., Hunt, L.K., Ghosh, T., Eder, J. "HI Evolutionary Studies of IR-Selected AGNs", 2002, BAAS, 201.5205
37. Salter, C.J., Jeyakumar, S., Saikia, D.J., Ghosh, T., Stutzki, J., "HI Absorption towards Compact Steep Spectrum Radio Sources", 2003, BAAS, 202.4210

38. Reilly (deceased), K., Salter, C.J., Ghosh, T., "Continuum mapping of an interaction Region within Loop-I (the North Polar Spur) in the ISM", 2003, BAAS, 20311015
39. Ghosh, T., Kavars, D.W., Robinson, R.E., Saintonge, A., Strasser, S.T., Salter, C.J., "High Sensitive Observations of the Satellite OH Lines of Arp 220", 2003, BAAS, 20311508
40. Kanekar, Nissim, Chengalur, Jayaram N., Ghosh Tapasi, "Conjugate 18-cm OH satellite Lines at a Cosmological Distance", 2004, PhRvL, 93, 1302
41. Zahid, J., DeCesar, M., Kinnaman, L., Rice, M., Saucedo-McQuade, K., Ghosh, T., Momjian, E., Salter, C.J., 2004, BAAS, "Neutral Hydrogen in the Galaxy Cluster, Abell 2390",
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43. Momjian, E., Ghosh, T., Salter, C.J., Venkataraman, A., 2004, BAAS, "eVLBI observations with the 305m Arecibo Radio Telescope", 36,1604.
43. Gupta, N., Ghosh, T., Jeyakumar, S., Saikia, D.J., Salter, C.J., Srianand, R., 2005, "Probing Radio Source Environments using Absorption Lines", Proc. XXVIIIth General Assembly of URSI, New Delhi, in press.
44. Gupta, N., Ghosh, T., Jeyakumar, S., Saikia, D.J., Salter, C.J., Srianand, R., 2005, "Probing radio source environments using absorption lines", Bull. Astr. Soc. India, 33, 397.
45. Paragi, Z., Garrett, M.A., Bohdan, P., Kouveliotou, C., Szomoru, A., Reynolds, C. Parsley, S.M., Ghosh, T., "e-VLBI observations of SN2001em - an off-axis GRB candidate", 2005, MmSAI, 76, 570
46. Taylor, G.B., Momjian, E., Pihlstrom, Y., Ghosh, T., Salter, C.J., "Late Time Observations of the Afterglow and Environment of GRB 030329", 2005, ApJ, 662, 986
47. Gupta, N., Salter, C.J., Saikia, D.J., Ghosh, T., Jeyakumar, S., "Probing Radio Source Environments via HI and OH Absorption", 2006, Mon. Not. R. astr. Soc., accepted. (astro-ph/0605423).
48. Momjian, E., Salter, C.J., Ghosh, T., Chengalur, J., Kanekar, N., Keeney, B.A., Stocke, J.T. "Arecibo HI Observations of the Sub-DLA at  $z=0.0063$  towards PG1216+069", 2006, American Astronomical Society Meeting Abstracts, 208, #15.03