

DATE OF BIRTH

May 17, 1971

MARITAL STATUS

Married

NATIONALITY

Indian

ADDRESS FOR CORRESPONDENCE

Reader,
Center For Theoretical Physics,
Jamia Milia Islamia,
New Delhi 110025,
India

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CURRENT POSITION

I am currently working as Associate Professor, at the Center For Theoretical Physics, in Jamia Millia Islamia Central University, New Delhi.

POST DOCTORAL EXPERIENCE

- I was a Post Doctoral Fellow at **Harish-Chandra Research Institute** in Allahabad, India from November 1999 to November 2001.
- I joined as a Post Doctoral Fellow in **CENTRA, Department of Physics, Instituto Superior Tecnico** in Lisbon Portugal under the Project "*Energy Densities in the Universe*" Funded by FCT (Portuguese Foundation for Science and Technology) in December 2001 and worked till September 2003.
- In October 2003, I joined as a Post Doctoral Researcher in the **CFIF, Department of Physics, Instituto Superior Tecnico** in Lisbon, Portugal with an Individual Grant from FCT, Portugal and worked till August 2004.
- I have joined as a Post Doctoral fellow (in December, 2004), in the **Department of Physics and Astronomy, Vanderbilt University**, in U.S.A and worked there till February 2007.

RESEARCH FIELD

Gravitation, Astroparticle Physics and Cosmology.

RESEARCH INTERESTS

1. **Dark Energy and Late Time Acceleration of the UNiverse**

- Theoretical model building of dark energy and late time acceleration of the universe both in Einstein gravity and scalar-tensor gravity theories.
- Dynamical systems analysis of dark energy models.
- Unified models for dark energy and dark matter.

- Constraining the parameters of different dark energy models from cosmological observations, in particular SNIa and Cosmic Microwave Background Radiation (CMBR) observations.
- Study of structure formation in dark energy models.

2. Aspects of Brane-World Cosmology

- Inflationary models in early universe in the brane world scenario. Study of slow-roll inflation and spectra of density perturbations.
- Randall-Sundrum model and its cosmological implications, in particular, through the radion dynamics.
- Supergravity inflation in the context of brane world models.
- Rolling tachyon cosmology and its inflationary implications in brane world scenario.

3. Aspects of Loop-Quantum Cosmology

- Inflation in semiclassical loop quantum cosmology (LQC) and calculation of the spectra of density perturbation.
- Quantative analysis of bouncing solutions in LQC and evolution of density perturbation through bounce.
- Duality symmetry between scaling solutions of LQC and Randall-Sundrum brane-world scenario and its implication on calculating the inflationary parameters in LQC.

4. Gravitational Properties of Topological Defects

- Analytical and numerical study of solutions to the field equations in Einstein's gravity as well as different scalar tensor theories in both four and higher dimensional spacetime, in the context of topological defects, e.g cosmic strings and monopoles, both in the static and nonstatic case.
- Study of the behaviour of spacetime around cosmic strings and monopoles, in particular, existence of singularities, radiation and particle motions.

COLLABORATORS

1. Ph.D Supervisors

- Prof. Asit Banerjee, Jadavpur University.
- Dr. Narayan Banerjee, Jadavpur University.

2. Present Collaborators

- Dr. Emmanuel Sarikadis, Dept.of Physics, University of Athens, Greece.
- Dr. Sourish Dutta, Dept. of Physics and Astrophysics, Vanderbilt University, Nashville, USA
- Dr. Koushik Dutta, Max-Planck Institute For Physics, Munich, Germany.
- Prof. T.R. Seshadri, Dept. of Physics and Astrophysics, Delhi University, Delhi, India.
- Prof. Debajyoti Choudhury, Dept. Of Physics and Astrophysics, Delhi University, Delhi, India.
- Dr. Sayan Chakrabarty, Institute of Physics, Bhubaneswar, India.
- Dr. Pravabati Chingambam, KIAS, Seoul, Korea.
- Prof. Y.Y. Keum, Institute for Early Universe, Seoul, Korea.

3. Past Collaborators

- Prof. Robert Scherrer, Dept of Physics and Astronomy, Vanderbilt, University, USA.
- Prof. Diego Pavon, Dept.of Physics, Autonomous University of Barcelona, Spain.
- Dr. T. Barreiro, I.S.T, Lisbon.
- Prof. O. Bertolami, I.S.T, Lisbon.
- Prof. M.C. Bento, I.S.T, Lisbon.
- Dr. Vincenzo Cardone, Universita di Salerno, Italy.
- Prof. S. Cappozziello, INFN, Napoli, Italy.
- Dr. A. Troisi, INFN, Napoli, Italy.
- Dr. S. Sen, FCUL, CAAUL, Lisbon.
- Mr. N.C. Santos, I.S.T, Lisbon.
- Dr. T.R. Seshadri, University of Delhi, India.
- Dr. S. Sethi, R.R.I, India.
- Dr. D. Chaudhury, H.R.I, India.
- Dr. D. Jatkar, H.R.I, India.
- Dr. C. Romero, Universidade Federal de Paraiba, Brasil.
- Dr. A. Barros, Universidade Federal de Roraima, Brasil.
- Prof. A. Beesham, Zululand University, S. Africa.
- Dr. S. Chatterjee, New Alipore Collges, Calcutta, India.
- Dr. S. Bhattacharya, S.I.N.P, India.

EDUCATION

Ph. D. in Science :

Institution : Department of Physics, Jadavpur University, Calcutta.

Year: 1999.

Title of the Thesis: Some Aspects Of Early Universe.

Post Graduation (M.Sc) in Physics:

Institution : Department of Physics, Jadavpur University, Calcutta.

Performance: First class

Year: 1994

Undergraduation (B.Sc with Phys.Hons.):

Institution : Department Of Physics, Jadavpur University, Calcutta.

Performance : First Class with Distinction in Subsidiary subjects.

Year: 1992.

Senior Secondary School:

Board : West Bengal Council of Higher Secondary Education. Calcutta.

Performance : First Division

Year: 1989.

Secondary School:

Board : West Bengal Board of Secondary Education. Calcutta.

Performance : First Division.

Year: 1987.

AWARDS & SCHOLARSHIPS

- Obtained award certificates for high ranking in district from the District Municipality.
- Obtained **National Merit Scholarships** from the Education Department, Government of India for good performances in higher secondary school examination.
- Qualified the GATE-94 examination conducted jointly by all the Indian Institute Of Technologies (IITS⁷) in India to obtain fellowship for doing my Ph.D.
- Selected for Post Doctoral Fellowship in Inter University center for Astronomy and Astrophysics, Pune, India in 1999. Declined.

- Selected for Post Doctoral Fellowship in Harish Chandra Research Institute, Allahabad, India in 1999. Joined.
- Selected for Post Doctoral Fellowship in Inter University center for Astronomy and Astrophysics, Pune, India in 2001. Declined.
- Selected for Post Doctoral Fellowship under Prof. Orfeu Bertolami in Instituto Superior Technico in Lisbon, Portugal, under the F.C.T (Govt. of Portugal) grant “Energy Density of the Universe in 2001. Joined.
- Obtained 3 years Individual Research Grant from F.C.T (Portuguese Foundation for Science and Technology) for Post Doctoral Research in Portugal in 2003.. Joined.
- Selected for Post Doctoral Fellowship in Inter University center for Astronomy and Astrophysics, Pune, India in 2004. Declined.
- Selected for Post Doctoral Fellowship in the Dept. of Physics and Astronomy in Vanderbilt University, Nashville, USA in 2004. Joined.
- Honorable Mention in the 2003 Essay Contest of the Gravity Research Foundation, US, for the essay ”Generalized Chaplygin Gas Model: Dark Energy - Matter Unification and CMBR Constraints” written with M.C. Bento and O. Bertolami.
- I have been awarded a Major Research Project in Science by University Grants Commission, Govt of India, for the financial year 2008-2011. The title of the project is “**Accelerating Universe and its observational signatures**”.

Visits, SCHOOLS, CONFERENCES & WORKSHOPS ATTENDED

- Attended ”2nd School on Space Astronomy” held at Tata Institute of Fundamental Research, India, from Oct 25-Nov 10, 1993.
- Attended ”Indo-French school on Understanding Large scale Structures in the Universe” , held at Inter University Centre for Astronomy and Astrophysics, India, from Jan 30-Feb 17, 1995.
- Attended ”XVIII Conference of the Indian Association for General Relativity and Gravitation”, held at the Institute of Mathematical Sciences, India, from Feb 15-Feb 17 1996.
- Attended ”GR-15 Conference” held at Inter University Center for Astronomy and Astrophysics at Pune, India during December, 1997.
- Attended ”Orientation Meeting on the Exact Solutions in General Relativity and the XIX IAGRG meeting ” held at Gorakhpur University in January 1999.

- Visited Benaras Hindu University, Deptt. Of Physics Under Theoretical Physics Seminar Circuit in February 1999.
- Visited Mehta Research Institute , Allahabad, in March 1999 under Theoretical Physics Seminar Circuit.
- Attended the COSMO-99 workshop in Sepetember 1999 at Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- Attended the International Conference on Gravitation and Cosmolgy in January 2000 at Indian Institute of Technology, Kharagpur, India.
- Attended the Summer School in Astroparticle Physics and Cosmolgy in June 2000, at Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- Attended the Conference Beyond Four Dimensions in July 2000, at Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- Attended the Strings 2001 in January 2001, at Tata Institute of Fundamental Research, India.
- Visited the Statistical Physics Group, in Department de Fisica of Universidad Autonoma de Barcelona, Spain, in June 2001.
- Visited Department de Fisica Fonamental, in Universitat de Barcelona, Spain in June-July 2001.
- Visited The Institut fur Theoretische Physik, in Technische Universitat Wien, Austria in July 2001.
- Visited The High Energy Physics Division, in Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, in June 2002.
- Attended XVIII th IAP Colloquium On the Nature Of Dark Energy, in Institut d'Astrophysique de Paris, France, in July 2002.
- Visited Department of Physics, University of Pais Vasco, Bilbao in Spain, in May 2003
- Attended Moriond 2004 on Exploring The Universe in March 2004 in La Thuile Aosta Valley, Italy.
- Visited Department of Astronomy and Astrophysics, Tata Institute for Fundamental Research, in Mumbai, India, in October 2004.
- Attended Frontiers In Contemporary Physics - III, in Vanderbilt University, USA in May 2005.
- Attended SLAC Summer Institute on Gravity and Quantum World in SLAC, Stanford, USA in July 2005.

- Attended New Views of the Universe, Kavli Institute Inaugural Symposium in memory of David Schramm, in Chicago, USA in December 2005.
- Attended the Workshop on Cosmology and Strings, at Abdus Salam International Center for Theoretical Physics in Trieste, Italy, in July 2007.
- Visiting Professor in Statistical Physics Group, in Department de Fisica of Universidad Autonoma de Barcelona, Spain, for a month in November 2007.
- Attended the workshop on “Physics of Warped Extra Dimension” at Indian Institute of Technology, Kharagpur, India during February 2008.
- Attended the “CMB-LSS” workshop at Inter University Center For Astronomy and Astrophysics, at Pune, India during August 2008.
- Visited Inter University Center For Astronomy and Astrophysics, Pune, India in December 2008 under Research Associateship program.
- Visited Theory Division, CERN, Geneva, Switzerland, in April-May 2009.
- Visited High Energy Physics Division, Abdus Salam International Center For Theoretical Physics, Trieste, Italy, in May 2009.

TALKS, SEMINARS AND POSTERS DELIVERED

- I have presented a paper on Static and nonstatic global strings in XVIII Conference of the Indian Association for General Relativity and Gravitation, held at the Institute of Mathematical Sciences, India, from Feb 15-Feb 17 1995.
- I have presented a Seminar on Gravitational fields of cosmic strings in Brans-Dicke theory in the early Universe session of the ”GR-15 Conference” held at Inter University Center for Astronomy and Astrophysics at Pune, India during December, 1997.
- I have presented a Seminar on Superconducting string in Brans-Dicke theory in the Orientation Meeting on the Exact Solutions in General Relativity and XIX IAGRG meeting held at Gorokhpur University in January 1999.
- I have presented a seminar on the Gravitational Properties of Topological Defects in the Department of Physics, Benaras Hindu University in February 1999 under Theoretical Physics Seminar Circuit.
- I have presented a seminar on Gravitational Fields of Cosmic Strings and Monopoles in Mehta Research Institute , Allahabad, in March 1999 under Theoretical Physics Seminar Circuit.
- I have presented a poster on Superconducting Cosmic String in Brans-Dicke Theory, in the International Conference on Gravitation and Cosmology in January 2000, at Indian Institute of Technology, Kharagpur University, India.

- I have presented a seminar on Late time acceleration of the universe and possible models in Mehta Research Institute , Allahabad, in November 2000.
- I have delivered a public talk on Possible models for the late time acceleration of the universe in the Department de Fisica Fonamental, Universitat de Barcelona, Spain in July 2001.
- I have presented a seminar on Possible models for the late time acceleration of the universe in The Institut fur Theoretische Physik, Technische Universitat Wien, Austria, in July 2001 .
- I have delivered a Astrophysics Journal Club talk in Mehta Research Institute in July 2001 on the paper ” A Redshift-Magnitude Relation for Nonuniform Pressure Universe” by M P. Dabrowski, ApJ, 447, 43 (1995).
- I have presented a poster on Quintessence Model with Double Exponential Potential in XVIII the Colloquium On the Nature Of Dark Energy, in Institut d’Astrophysique de Paris, France in July 2002.
- I have presented a seminar on Generalized Chaplygin gas, Accelerated Expansion and Dark-Energy-Matter Unification in CFIF, Dept. de Fisica, I.S.T Portugal in November 2002.
- I have presented a seminar on Generalized Chaplygin gas, Accelerated Expansion and Dark-Energy-Matter Unification in Dept. of Physics, University of Pais Vasco, Bilbao, Spain in May 2003.
- I have presented a seminar on Generalized Chaplygin gas, Accelerated Expansion and Dark-Energy-Matter Unification in the Theory Group, Department of Physics, Indian Association for Cultivation of Sciences, India in July 2003.
- I have presented a seminar on Generalized Chaplygin gas, Accelerated Expansion and Dark-Energy-Matter Unification in the Relativity and Cosmology Research Centre, Department of Physics, Jadavpur University, India in July 2003.
- I have presented a seminar on Generalized Chaplygin gas, Accelerated Expansion and Dark-Energy-Matter Unification in Harish Chandra Research Institute, Allahabad, India in July 2003.
- I have presented a seminar on Generalized Chaplygin gas, Accelerated Expansion and Dark-Energy-Matter Unification in the Department of Physics, Indian Institute of Technology, Kanpur, India in July 2003.
- I have presented a seminar on Generalized Chaplygin gas, Accelerated Expansion of the Universe in the Department of Astronomy and Astrophysics, Tata Institute for Fundamental Research, Mumbai, India in October 2004.

- I have presented a Particle-Cosmology Journal Club Seminar in the Dept. Of Physics and Astronomy in Vanderbilt University, USA, on Generalized Chaplygin Gas, in February, 2005.
- I have presented a talk on Generalizing Generalized Chapygin Gas, in the Model Building Session of the Conference Frontiers in Contemporary Physics, held at Vanderbilt University in May 2005.
- I have presented a Particle-Cosmology Journal Club seminar in the Dept of Physics and Astronomy in Vanderbilt University, USA, on Modified Gravity Approach for Accelerating Universe in October 2005.
- I have presented a poster on Generalizing the Generalized Chaplygin Gas, in New Views of the Universe, Kavli Institute Inaugural Symposium in memory of David Schramm, in Chicago, USA in December 2005.
- I have delivered a lecture on Genralized Chaplygin gas, and Acceleration of the Universe, in the Astrophysics Division of the Indian Institute of Science , Bangalore, India in November 2006.
- I have delivered an invited Lecture on Dark Energy and Accelerating Universe in the Department of Physics and Astrophysics, University of Delhi, in Delhi, India during Visitors Program Celebration in February 2008.
- I have delivered an invited lecture on Brane Inflation at Indian Institute of Technology, Kharagpur, India during the Physics of Warped Extra Dimension workshop, in February 2008.
- I have delivered a seminar on Cosmology with non-minimally coupled K-essence during the CMB-LSS workshop at IUCAA, Pune, India in August 2008.
- I have delivered a seminar on Dark Energy and Accelerating Universe at Physical Research Laboratory, Ahmedabad, India, under TPSC program in February 2009.
- I have delivered a seminar on Dark Energy and Accelerating Universe at S.N.Bose National Center for Basic Sciences in Kolkata, India in March 2009.
- I have delivered a seminar on Thawing Quintessence with Nearly Flat Potentials in the High Energy Division at Abdus Salam International Center For Theoretical Physics, Trieste, Italy in May 2009.
- I have delivered a seminar on Thawing Quintessence with Nearly Flat Potentials in the Indian Conference on Cosmology and Galaxy Formation at Indian Institute of Technology, Kanpur in October, 2009.
- I have delivered a talk on A New Approach For Modified Gravity Models in the Workshop on Field Theory and Gravity (FTAG) at H.N.B.Garwhal University, Srinagar, Garwhal in April 2010.

- I have delivered an invited seminar on Thawing Quintessence with Nearly Flat Potentials in the Inaugural IEU Conference on Cosmology and Fundamental Physics at the Institute for Early Universe, Ewha Woman University, Seoul, Korea, in May 2010.
- I have delivered an invited seminar on Thawing Quintessence with Nearly Flat Potentials in the Korea Institute For Advanced Science (KIAS) in Seoul, Korea in May 2010.
- I Have delivered a seminar on Slow-Roll Scalar Field models of dark energy in the Cosmology Group weekly seminar at Abdus Salam International Center For Theoretical Physics, Trieste, Italy in July 2010.
- I have delivered an invited seminar on Thawing Dark energy models with nearly flat potentials in the Theory Group at the Max-Planck Institute For Physics, Munich, Germany in July 2010.

COMPUTER EXPERIENCE

- I have obtained a Honors Diploma in Network-Centered Computing from National Institute of Information Technology (NIIT), Calcutta.
- Operating System used: Redhat-Linux, Windows XP.
- Languages known: Fortran 77, C, C++.
- Mathematical Packages used: Mathematica, Matlab, Grace-5.0, Gnuplot, GRTensor.

TEACHING EXPERIENCE

While doing my Ph.D in Jadavpur University, I have taught undergraduate classes in both Engineering and Science Faculty. I have given the courses on Kinetic Theory of Gases, Classical Mechanics and Basic Quantum Mechanics. I have also taken Physics Laboratory Classes for Science Undergraduate students.

In 2007-2008 academic session I have taught the General Relativity and Cosmology course and Mathematical Physics II (Statistical Techniques in Physics) course in the First Year Graduate program for Ph.D students in Center for Theoretical Physics, Jamia Millia Islamia, New Delhi. In 2008-2009, I taught General Relativity and Cosmology for the M.Sc Final year (Theory Specialisation) course in Department of Physics in Jamia Millia Islamia. I have also taught the same course for the First Year Graduate program for Ph.D students in Center for Theoretical Physics, Jamia Millia Islamia in 2008-2009 academic session.

Currently teaching Statistical Techniques in Physics in the Graduate Course for Phd students at Center For Theoretical Physics, J.M.I.

I have also worked as a Tutor for the General Relativity and Cosmology course in the Preparatory High Energy Physics SERC School, held at S.G.B.T. Khalsa College, Delhi, in October 2008.

PHD Thesis Supervision

- N.Chandrachani Devi, Enrolled in October 2007. Thesis Title: Issues of accelerating universe in particle physics and cosmology.
- Gaveshna Gupta, Enrolled in October 2007. Thesis Title: Dark Side of the Universe and its observational signatures.

ACTIVITIES

- Life Member of the Indian Association for General Relativity and Gravitation.
- **Regular Associate of the Inter-University Center For Astronomy and Astrophysics, in Pune India.**
- **Regular Associate of the Abdus Salam International Center For Theoretical Physics, Trieste, Italy.**
- Refereeing: Physics Letters B, Modern Physics Letters A, Astrophysics and Space Sciences, Europhysics Letters, General Relativity and Gravitation and Pramana.
- Convenor, VIII meeting on Field Theoretic Aspects of Gravity to be held at H.N.B. Garhwal University, Srinagar, Uttarkhand from 19th-23rd April 2010.