

Dr. B.D.Acharya, F.N.A.Sc., F.A.I.M.S.

A brief biography

Dr. Belmannu Devadas Acharya

(September 17, 1947-June 18, 2013) was a professor emeritus of graph theory from University of Mysore till last breadth. He was born on 17th September 1947 at Udupi, Karnataka, India. He took his B.Sc. (Physics) and M.Sc. (Mathematics) degrees from Karnatak University, Dharwad in 1969 and 1971 respectively. He was completed Ph.D. from IIT, Bombay in the year 1976 on graphs and hypergraphs.



In the last day of his life (passed away on 18th June 2013) he continue *fundamental research in Hypergraph Theory and its Applications, especially in Social Network Analysis*. He was reside at Delhi and Bangalore. *Dr. Acharya was* Honorary Visiting Professor, Srinivasa Ramanujan Center for Intensification of Interaction in Interdisciplinary Discrete Mathematics.

University of Mysore. Also at Visiting Full Professor, Center for Mathematical Sciences, Kerala, Adjunct Professor, Center for Excellence in Interdisciplinary Mathematics, New Delhi, Visiting Professor, Kalasalingam University, Tamil Nadu. The most significant post held by Dr. Acharya are PSO, DST, GoI, New Delhi (Through UPSC) (1985-1992), Director, DST, New Delhi (1992-1997), Adviser ('Scientist 'G'), DST, New Delhi (1997-2007) along with other assignments.

He has published more than 145 research articles in reputed international and national journals, conference proceedings and 15 papers was under preparation/revision. Dr. Acharya along with other graph theoretician written 15 monographs and edited books and two was under preparation. He also written several non-scientific popular articles. Dr. Acharya has guided formally and informally about 20 students for their Ph.D. degree.

He was not only a conventional scientists, he was a Philosopher, motivator, initiator and encourage a lot of people and organizations, institutes for the betterment of the society. The other achievements made by Dr. Acharya are given below.

- **Advisory Editor** of the following research journals
 - a. *Journal of Information & Optimization Sciences.*
 - b. *Journal of Discrete Mathematical Sciences & Cryptography*
 - c. *Journal of Applied Algebra and Discrete Structures*
- **Member** of the **Board of Editors** for the following reputed research journals:
 - a. *International Journal of Management & System Sciences*
 - b. *Indian Journal of Mathematics*
 - c. *AKCE International Journal of Combinatorics and Graph Theory*
 - d. *International Journal of Mathematical Modeling & Computer Simulation*
 - e. *Indian Journal of Mathematical Sciences*

Dr. Acharya was

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- A member of the Editorial Board of the *Ramanujan Mathematical Society's Lecture Notes Series in Mathematics*
- The founder Editor-in-Chief of the ADMA Newsletter
- A Member of the Expert Committee on Under-graduate Courses in Mathematical Sciences in the University of Delhi and the IGNOU
- Refereed over 1000 research papers for various internationally reputed research journals. In particular, acknowledged as *one of the only three* referees from India for papers received from *Discrete Mathematics*.
- Invited reviewer for Mathematical Reviews of the *American Mathematical Society* and consequently earning its Membership.
- Delivered a course of 10 under-graduate level Video-Lectures on Graph Theory under invitation from a UGC distance training programme.
- Delivered Platinum Jubilee Lecture at the Indian Science Congress Annual Session held at Hyderabad during January 2006.
- Invited by the Indira Gandhi National Open University to write a Text Book on MATHEMATICAL LOGIC as a part of its under-graduate programme of Distance Education in *Discrete Mathematics*.
- More than 25 research papers cited, quoted and used in the works of other experts in the field, especially in three recent monographs published by Pitman, London (authored by a German mathematician named *Erick Prisner*) and Cambridge University Press, Cambridge, U.K. (authored by a Yugoslav mathematician named *Slobodan Simic*) SIAM (authored by *McMorris and McKee*).
- Delivered more than 500 (half-hour to 1-hour) Invited Talks in various national and international conferences/seminars on Discrete Mathematics held in different parts of the world.
- Invited Founder Life Member as well as of the first Executive Committee of the Indian Society for Mathematical Modelling and Computer Simulation.
- Life Member of the Indian Mathematical Society (IMS), Ramanuja Mathematical Society (RMS), Allahabad Mathematical Society, Calcutta Mathematical Society, Academy of Discrete Mathematics and Applications (ADMA), Forum for Interdisciplinary Mathematics, Indian Society for Mathematical Modelling and Computer Simulation and the National Academy of Sciences (India).
- Dr. Martin Manrique, Department of Mathematics, National Autonomous University of Mexico, Mexico, joined under my supervision as a Post-Doctoral Fellow, with fellowship from the Mexican Govt., on 1st June 2011 at the CGRF, n-CARDMATH, Kalasalingam University, Krishnankoil, Tamil Nadu.
- Initiated Monthly Informal Group Discussion in Discrete Mathematics and Applications (MIGD-DMA) in Bangalore on 19th July 2011 toward setting up eventually the Bangalore Chapter of the Academy of Discrete Mathematics and Applications (ADMA).
- Elected a *Fellow of the National Academy of Sciences* (India), ("*F.N.A.Sc.*") in the year 2003.
- Elected a *Fellow of the Allahabad Mathematical Society*, ("*F. Al. M. S.*") in the year 2009.

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- Elected Vice-President of the Academy of Discrete Mathematics and Applications (ADMA) for the two-year period 2010-2012.
- Architect of the Detailed Project Report (DPR) for the establishment of “Dr. D.C. Pavate Institute of Mathematical Sciences” (PIMS) as an autonomous research institute under the aegis of Karnatak University, Dharwad (KUD).
- Responsible for initiating a dialogue with the State Govt. of Rajasthan for the establishment of the “Bahmagupta Advanced Research Institute for Mathematics and Astronomy” (BARIMA) in 2011.

Programmatic

A concerted effort was launched by the him right from his date of joining DST to bring a multidisciplinary programme to support R&D and Advanced Training under DST's fold which somehow had remained unfulfilled; the first major event in this direction was to organize a *National Meet on Mathematical Sciences (March 14-15, 1989)* under the Chairmanship of Prof. J.N. Kapur with Dr. Acharya as its Convener. As a result of such long and sustained efforts (another such endeavor was the *National Debate* carried out by the *National Committee on Research, Education and Training in Mathematics* under the Chairmanship of the late Prof. P.K. Bose), DST created in August 1993 a Programme Advisory Committee on Mathematical Sciences (PAC-MS) under its Science & Engineering Research Council (SERC) with Dr. Acharya as its first Member-Convener, providing his expertise in the field of hypergraph and dihypergraph theories ever since.

The first major scientific contribution of Dr. Acharya came in his being nominated by the PAC-MS as a member of the two-member Expert Group of DST to assess the viability of creating an Advanced Research Centre (ARC) for Mathematical & Statistical Sciences in the Institute of Advanced Study in Science & Technology (IASST), Guwahati. Based on the report of this group, the SERC approved creation of the ARC under DST's programme on Intensification of Research in High Priority Areas (IRHPA) and the same was subsequently cleared by DST.

A Vision Paper on Mathematical Sciences, including perspectives on 10 different *Challenging/Thrust (C/T) Areas in Mathematical Sciences* was prepared for countrywide dissemination and for wide participation by mathematicians towards intensification of research in these areas. Five more areas were added subsequently during the implementation of the programme.

Dr. Acharya has published many "scope papers" in relevant newsletters for creating awareness about the DST's programmes of opportunity in mathematical sciences amongst the mathematics community in India.

The Planning Commission, Govt. of India, invited Dr. Acharya to a Brainstorming Session on Mathematical Sciences held in its premises during July 1994 and nominated him to be the Member-Convener of its Task Group, under the Chairmanship of Prof. H.P. Dikshit, to prepare a report on “Perspectives into Fostering Excellence and User-oriented Programmes in Mathematical Sciences” which was subsequently prepared and submitted to the Planning Commission. The report was not only accepted by the Planning Commission without any modification but also directed to be taken up by DST for coordinating its implementation by the Govt. of India.

Consequently, the undersigned initiated a continuing effort on intensification of interaction between mathematicians and industry through a programme termed (in the

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aforesaid Task Group Report) "Open Sessions" which were required to be organized preferably by the professional societies in collaboration with an industry/user. Separately, under PAC-MS, industry-collaborated research projects are also now being sponsored with focus on industry/user-oriented R&D.

Taking note of the outcry that students are not opting to take up a career that requires special mathematical skills, further down the line that mathematics itself has become the "last resort" to pursue higher education, it became imperative to attract the young students to take up mathematics as their first choice for study by making it "interesting and enjoyable first", for it is a well-recognized fact that without a study of the rigors of mathematics its appreciation and/or application to solve a given problem would be merely a far cry. Equally important is to generate a feeling of its utilitarian aspects amongst the general public. Keeping these points in view, he initiated a multi-pronged National Mathematical Sciences Initiative (NMSI) under which one of the core ideas is to provide for organizing 10-day long Group Discussions on various specialized topics in mathematical sciences as an intensive interaction programme. The pool of young mathematicians generated by this programme has since been providing a noticeable inflow of active researchers into the emerging R&D system in the country.

Under another such programme element under NMSI, six Centers of Mathematical Sciences (CMS) were created in the country (at Banasthali, Bangalore, Hyderabad, Krishnankoil, Pala and Varanasi) to intensify R&D and Advanced training in all the thrust areas of mathematical sciences. One more such center, named "Srinivasa Ramanujan Center for Intensification of Interaction in Interdisciplinary Discrete Mathematical Sciences" (SRC-IIIDMS) slated to function under the Academy of Discrete Mathematics and Applications (ADMA), an existing professional society having its Registered Head Quarters at the Department of Studies in Mathematics, University of Mysore, Mysore, is partially in place at the University of Mysore and is likely to take shape very soon, after its Draft Project Report is approved by DST.

Yet another perspective under the NMSI is to develop a core group of leaders in each of the prominent allied areas of mathematical sciences such as :

- New Methods of computing
- Cybernetics and systems
- Logic systems
- Random discrete structures
- Social network analysis
- Quantitative Structure-Activity Relation (QSAR) Analysis in bio-chemical and chemo-physical reactions
- Cryptosystems.

Several national and international level instructional conferences on the above themes were organized to crystallize programmatic aspects to achieve this goal.

From the working experience of Dr. Acharya at DST, it appears that no agency under the Govt. of India is charged with the responsibility to inform and enthuse the general public about the importance of at least being aware of the excitement of doing, and the importance of, mathematics! Dr. Acharya successfully demonstrated how these objectives could be fulfilled effectively, as also motivate and train young college/university students to undertake this challenge, by means of designing special exhibition/demonstration kits/packages, often involving quite complex ideas in hard-core

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mathematics and even designing computer software/programmes. Such exhibition stalls put up at the Annual Sessions of the Indian Science Congress Association (ISCA) amply demonstrated the effectiveness of this method. Even in the final layout of the Exhibition stalls at the DST Pavilion, during the ISCA Annual Sessions at Calcutta and Delhi, the contribution of the undersigned proved effective in the flow of comprehension of various mathematical ideas presented for the general public.

- Towards concretizing a viable national programme with the broad perspectives provided under the NMSI, the undersigned participated intensively in several interaction meetings with a multitude of project groups such as those from St. Stephen's College (University of Delhi), Delhi, Institute for Mathematical Sciences (IMSc), Chennai, Ramanujan Institute for Advanced Study in Mathematics (RIASM), University of Madras, Chennai, Srinivasa Ramanujan Center, SASTRA, Kumbakonam, Periyar Science & Technology Museum, Chennai, Meerut University, Meerut, Karnatak University, Dharwad and experts from the Indian Statistical Institute (ISI), Delhi, IIT, Delhi, the Departments of Mathematics/Statistics/O.R., University of Delhi, Delhi, Bharathidasan University, Tiruchirappalli, Cochin University of Science & Technology (CUSAT), Kochi, the Indian Statistical Institute, Kolkata, Indian Institute of Science (IISc), Bangalore, etc., for formulating the technical components of the pilot proposal and subsequently to discuss various aspects of its implementation.
- Designer and Coordinator for the Mathematics Exhibition Pavilion set up at the Annual Sessions of the Indian Science Congress during the period from 1987 to 1996.
- Motivator for the setting up of the 'Centre for Mathematical Sciences' at
 - St. Stephen's College, Delhi
 - St. Thomas College, Pala (Kerala)
 - Banasthali Vidyapeeth, Rajasthan
 - Banaras Hindu University, Varanasi
 - Indian Institute of Science, Bangalore
 - University of Hyderabad, Hyderabad.
 - Institute of Advanced Study in Science & Technology (IASST), Guwahati
- Motivator for the creation of Compact Discs on the life and works of the legendary Indian mathematician, Sir Srinivasa Ramanujan, F.R.S.
- Motivator for the setting up a 'PIE Pavilion' at the Periyar Museum, Chennai.
- Motivator for the setting up a 'Kiosks on Srinivas Ramanujan's Memorabilia' set up at the Ramanujan Institute of Advanced Studies in Mathematics, Madras University, Chennai.
- Responsible for the creation of two DST-Srinivasa Ramanujan National Chairs for Mathematics.
- Motivator for the setting up of the 'Srinivasa Ramanujan Centre for Intensification of Interaction in Interdisciplinary Discrete Mathematics' (SRC-IIIDMS), Mysore.
- Motivator for the formation of the society 'Academy for Discrete Mathematics and Applications' (ADMA), Mysore.
- Motivator and responsible for the creation of the virtual network-based national institution 'National Centre for Advanced Research in Discrete Mathematics' (n-

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CARDMATH) with the establishment of its first *node* 'Core Group Research Facility' (CGRF) at the Kalasalingam University, Ananda Nagar, Krishnankoil, Tamil Nadu.

- Motivator and responsible for the creation of the first long-term series of frontline publications 'Ramanujan Mathematical Society's Lecture Notes Series in Mathematics' (RMS-LNSM) as a joint venture between DST and the Ramanujan Mathematical Society (RMS), by establishment of the DST-RMS-LNSM Field Office at Mysore and the Office of the Editorial Board (OEB) at the Bhaskaracharya Pratishthana, Pune.
- Motivator and responsible for pioneering the idea of creation of a National Mathematical Sciences Initiative (NMSI) to wide-base the activities to promote mathematical sciences in the country.
- Motivator and responsible for pioneering the idea of creation of an All-India Coordinated Programme on Ionosphere-Thermosphere Study (AICPITS) to wide-base the activities to promote research on Earth's Upper Atmosphere in the country.
- Motivator and responsible for pioneering the idea of creation of an All-India Coordinated Solar-Terrestrial Energy Programme (STEP) to wide-base the activities in the country to promote research on the morphology and dynamics of the Solar-Terrestrial medium.
- Motivator and responsible for pioneering the establishment of a countrywide network of Stratosphere-Troposphere (S-T) Radars to initiate a countrywide coordinated study of the morphology and dynamics of stratosphere-troposphere interactions, especially in the context of Global Climate Variability impacts. The Pilot project involving the indigenous design and fabrication of the high-tech S-T radar with location-specific parameter characterization is already underway for installation and operation at the Aryabhata Research Institute for Observational Sciences (ARIES), Nainital.
- Motivator and responsible for pioneering the idea of creation of a National Centre for Field Operations and Research in Himalayan Glaciology (NCFOR-HG) to wide-base the activities to promote research in Himalayan Glaciology in the country.
- Motivator and responsible for pioneering the idea of creation of a National Initiative in Mathematical Modelling in Behavioural, Cognitive and Social Sciences (NIMM-BeCoSoSci) to wide-base the activities to promote frontline quantitative research in Behavioural, Cognitive and Social sciences in the country. Under this initiative, First and the Second International Conferences on Logic were held in the country (at IIT, Bombay and Calcutta University, Kolkata during the years 2005 and 2006, respectively). Also, the first ever International Conference on 'Cybernetics, Systems and Man' was organized at the IASST, Guwahati – and intensive Advanced Training Programme was also held under its aegis.
- Motivator and responsible for setting up a national network of Mountain Meteorological Stations, especially dense in the Indian side of the Himalayan terrain, towards mitigating the casualties to the defense personnel in the operational fronts by means of increased accurate predictions about the mesoscale hazardous hydro-meteorological conditions such as avalanches, thunderstorms and cloud-bursts.
- Motivator and responsible for creation of awareness and importance of the subject of Aviation Meteorology through organizing the advanced training programmes such as the SERC Schools on the topic. The first 5-year cycle of such training schools was

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successfully conducted at the Air Force Administrative College (AFAC), Coimbatore.

- Have contributed immensely as nominated Member of the Board of Governors of the following national institutions:
 - a. Indian Institute of Tropical Meteorology (IITM), Pune
 - b. Indian Statistical Institute, Kolkata
 - c. Indian Institute of Plywood Research and Training, Bangalore
 - d. Indian Council of Forest Research and Education, Dehradun
 - e. Wadia Institute of Himalayan Geology, Dehradun
- Have contributed extensively as a nominated member of several technical policy-making national level committees of the following Central Govt. agencies:
 - a. Department of Space,
 - b. Ministry of Environment and Forests
 - c. Ministry of Agriculture
 - d. Department of Ocean development
 - e. Ministry of Defense
 - f. India Meteorological Department
 - g. Survey of India
 - h. Ministry of Statistics and Planning
 - i. Central Planning Commission
- Have contributed immensely as a nominated Member of the Punjab State Council for Science and Technology, Chandigarh.
- Secretary's nominee in the Programme Advisory Committee on Computers, Electronics and Mathematics (PAC-CEM) of the International Division, DST, Government of India, New Delhi (w.e.f. 22.02.2012).
- Dr. Acharya was elected as *Vice President* of the international Forum for Interdisciplinary Mathematics at its international general meeting held in USA during August 1995 for the second time.
- He was also elected as a Member of the Governing Council of the Forum for Interdisciplinary Mathematics (FIM) for a period of three years w.e.f. January 2012.
- Dr. Acharya was edited a feature film "Enigma of Srinivasa Ramanujan", that won the 1987 National Award for the Best Feature Film.
- Motivator and responsible for the creation of the annual "Professor Frank Harary Endowment Lecture" under the Academy of Discrete Mathematics and Applications (ADMA).

Foreign assignments

- **1982:** CNRS Visiting Professor at *ER-175 COMBINATOIRE* (Research Group led by Prof. Claude Berge), University of Paris, France
- **1986:** Visiting Scientist at *CIRM*, Luminy, Marseille, France
- **1999:** Exploratory Visiting Professor, *Alfred Renyi Mathematical Institute*, Hungarian Academy of Science, Budapest.
- **2003:** Leader of the Indian Delegation to the "First International Conference on Climate Variability", Baltimore, USA.