

red a number of books on diverse subjects. In 2007, he organized a major international conference 'METALLO 07' in the honour of his guru, T. R. Anantharaman at IIT Kanpur. The proceedings were published in special issues of *Journal of Materials Science and Transactions* of Indian Institute of Metals. Apart from publishing numerous papers in international journals, Bala published extensively in Indian journals, such as 14 papers in *Transactions of the Indian Institute of Metals*, 19 papers in *Current Science* and several thematic issues in *Indian Journal of History of Science*. Several of his figures adorned the cover page of these journals. In addition, Bala served on the editorial board of a number of academic periodicals including the *International Journal of Corrosion*, *The International Journal of Corrosion Science*, *Engineering and Technology*,

*Transactions of the Indian Institute of Metals*, *Kolkata*, *The Open Corrosion Journal*, *The Collection Indologie, Paris*, *The Journal of South Asian Archaeology*.

In recognition to his outstanding contributions in the field of metallurgy, materials science and archaeometallurgy, Balasubramaniam received a number of awards, including Young Scientist Award from the Indian National Science Academy (1993), Alexander von Humboldt Foundation Research Fellowship (1996), Materials Research Society of India (MRSI) Medal (1999), Metallurgist of the Year Award (1999) from the Ministry of Steels and Mines, Government of India. In September 2009, Balasubramaniam became the first occupant of the B. B. Lal Chair at IIT Kanpur. He was a member of the National Commission for History of Science.

Apart from academics, Bala was an enthusiastic sportsman and an avid cricketer. He had a great passion for both Indian and Western music. Bala was adept at playing the western classical guitar and was an ace drummer too.

He had every gift except one of long life.

He is survived by his wife Gaitri and two daughters, Gowri and Gargi.

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## Sukumar Biswas (1924–2009)

India lost one of its leading solar physicists when Sukumar Biswas passed away on 16 November 2009. He had the unique distinction of having worked closely with two of the leading physicists, who built major scientific research institutions in independent India – Homi Bhabha and Meghnad Saha.

He was born on 1 July 1924 in Jalpaiguri in West Bengal. All through his school and university education, he was a distinguished student. After graduating from Calcutta University, he continued his interests in physics with Meghnad Saha in Calcutta. When Hopper of the University of Melbourne offered him to work with him for his second Ph D he accepted the offer and distinguished himself in Australia with his research in nuclear physics. When Bhabha started the Atomic Energy Programme, Biswas moved to work with him in Mumbai. He was with the Tata Institute of Fundamental Research almost from its start until he retired as Senior Professor in 1989. Then, he continued there until 1992 as Emeritus Professor.

His research career spanning more than four decades resulted in several

unique contributions. Using the nuclear emulsion techniques, his earlier contributions to discovering new particles are well known to experimental particle physicists. Later on, when he went to work in Minnesota, he turned his attention to cosmic ray composition studies



using nuclear emulsions. He was a member of the group which detected nuclei heavier than helium in cosmic rays. After his return to TIFR, he worked on the composition of cosmic rays using nuclear

emulsions. His contributions to the heavy primary cosmic ray work brought new laurels to India in this field. He then went on to interpret the propagation of cosmic ray nuclei. One of his major achievements is the development of space borne detector *Anuradha* to detect solar cosmic ray composition. This was his last contribution to cosmic ray research.

Biswas received several honours including the fellowship of the three science academies in India and the American Physical Society. He was one of the earliest to get the UNESCO Fellowship. His *Anuradha* experiment fetched him the NASA Public Service Group Achievement Award. He was the recipient of C. V. Raman Award in 1984. He had the distinction of becoming an academician of the International Academy of Aeronautics.

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