

Obituary: Dr. K. S. V. Nambi (1938 – 2017)



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Former Head, Environmental Assessment Division
Bhabha Atomic Research Centre, Mumbai, India

Dr. K. S. V. Nambi (Kalakad Sankarnarayan Vadivaligia Nambi) was born on July 10, 1938 at Palayamkottai in Tamilnadu, India. As a student, Dr. Nambi had a brilliant career and he received Gold Medals for excellent performance at B.Sc. and M.Sc. (Physics) degree examinations of the University of Madras. Through a difficult national competition, Dr. Nambi was selected by the Atomic Energy Establishment of India to work at the Bhabha Atomic Research Centre (BARC). He worked at BARC till his superannuation in 1998 as the Head, Environmental Assessment Division. His Ph.D. Degree was based on a thesis on Thermoluminescence of Rare-earth Doped Calcium Sulphate Phosphors under Prof. A. K. Ganguly from the Gujarat University, Ahmedabad, India in 1974.

In the seventies, Drs. A. K. Ganguly, C. M. Sunta and K. S. V Nambi and their illustrious colleagues like, S. P. Kathuria, V. K. Jain, V. N. Bapat, B. D. Bhasin, A. Sunderarajan, M. David, R. Sashidharan, A. S. Pradhan, B.C. Bhatt, A. R. Lakshmanan and many others became a formidable dosimetry group that earned international acclaim through, its work on Ca-based and other phosphors and for its contribution to the overall development of thermoluminescence dosimetry and the physics behind it. This group also devel-

oped instrumentation for TL dosimetry (TLD readers, low temperature systems, exo-electron systems and many others) and developed new ideas on understanding the luminescence processes in materials. This group carried out large scale radiation survey using TLDs. Nambi's Redox Model has been widely used to understand luminescence process in various rare earth doped phosphors. To an extent, during the seventies, the TLD group at BARC became important movers and shakers of the TL dosimetry field and was highly productive in terms of their publications. Dr. Nambi organized the first Indian conference on Thermoluminescence and its Applications in 1990. This meeting provided the seeds for the initiation of the Luminescence Society of India (LSI) that is now providing a vibrant platform for all luminescence workers to meet annually. He served as the first President of the LSI and laid out good practices for its functioning.

Though not its direct mandate, this group also took upon a pilot study on the dating of archeological pottery and established the protocols. Later on, jointly with Martin Aitken, Dr. Nambi provided the conversion values for the computation of annual radiation dose from elemental concentration of radio-elements. The dating community used these factors for close to two decades. Drs. Nambi and Sunta were regular

features at the Luminescence and Electron Spin Resonance dating meetings organized by Martin Aitken - simply as Martin always felt the need for basic physics inputs to understand luminescence processes in minerals. He once mentioned to one of us, as to how much he respected the work by the Indian groups led by Sunta and Nambi and that he immensely applauded their 'established reputation'. Dr. Nambi served on the Editorial Board for *Ancient TL* and also contributed widely to ESR dating and more importantly on TL-ESR correlation. Even to-date, this is an area that needs further impetus, if TL/OSL has to really go beyond their present status.

In the area of environmental radiation dosimetry, based on their work on the coastal regions of Kerala, India, Nambi and Soman suggested a negative correlation between cancer incidences rates with gamma radiation levels measured using TLD's. This was in consonance with the concept of radiation hormesis. Though this work was criticized on some grounds, it none-the-less led to the establishment of two major programs in India. One was the establishment of cancer registry for cancer epidemiology in the high background areas of Kerala and the other one was on the occurrences of cancer mortality among workers in the Atomic Energy establishments. These programs have gone a long way in providing the scientific basis for understanding the effects of minimally low, but constant radiation exposure to humans.

Nambi was an enabler and always welcomed colleagues to join the team TLD and contribute to it. He led by example. He contributed through monographs. Notable was his monograph titled *Progress of Thermoluminescence Research on Geological Materials* with Dr. A.V. Sankaran and C. M. Sunta in Proceedings of the Indian National Science Academy. This close to 100 page monograph is a magnum opus on the TL properties of natural minerals. His lecture notes on *Thermoluminescence: its understanding and applications*, published in Brazil by Instituto de Energia Atomica, Cidade Uniersitaria has been landmark contributions and is a must read for all workers in TL. A report titled *U, Th and K distributions inferred from regional geology and the terrestrial radiation profiles in India*, based on field deployment and analysis of about 5000 TLD monitors across India demonstrates the breadth of work he covered. Many of us still advise new students in luminescence applications to read these articles as the basic introduction for understanding luminescence as a physical process and its applications.

In 1991, Nambi was given the responsibility to Head the Environmental Assessment Division at BARC. This was a responsibility that he led with rare aplomb by establishing environmental monitoring program around nuclear facilities in India using natural CaF₂ based environmental dosimeters. He also took up the Nuclear Aerosol Project to assess effects after nuclear accidents. He developed a nuclear aerosol test facility; initiated measurement of indoor radon; developed atmospheric gamma ray radiation program with solar powered systems; initiated measurement of heavy metals in herbal medicines and their impact on human health; developed protocols to measure aluminum build up during dialysis and for accentuated selenium level during treatment of

depression. These activities were noteworthy and once again depicted the range of themes he covered. Dr. Nambi was an avid reader and this habit sculpted his vision and helped him understand quickly, the nitty-gritty of new areas that he initiated. Some of these studies compelled removal of lead from Indian gasoline as anti knocking agent. His group also developed rugged continuous air particulate and gas monitoring system to measure a range of parameters from Solar radiation flux to Chemical and Industrial pollutants. He buttressed these with modeling and computational efforts.

It was not known to many that post superannuation, Dr. Nambi devoted his time in the study of ancient Tamil literature and that he wrote several books on Thirukural. Thirukural is a classic Tamil text consisting of 1330 couplets or kurals, dealing with the everyday virtues of an individual and is considered as one of the magnum opus of written work on ethics, morality and secular ethics. This activity resonated with the persona that Dr. Nambi was. As a scientist, Dr. Nambi impacted the Indian Environmental Assessment and monitoring studies in a big way. He built instrumentations where none existed, applied and explored new avenues and always buttressed experimental observations with models. And, as a person, Dr. Nambi touched many a lives with his ever affable and pleasant nature, and through his ever willingness to help a scientific cause. These were his landmark traits. Nambi was a friend in the truest sense of word and never hesitated giving his frank views and advice.

In his demise, the community lost a brilliant and a fearless individual, a close and a well meaning friend and a mentor to many. Analogous to the geological parlance, he was an extreme event in Indian environmental sciences that modulated and sculpted the landscape of radiation environmental sciences in India. Dr. Nambi breathed his last on April 29, 2017 and is survived by his wife (Sundari), daughter (Vijaya), son (Shankar), daughter-in-law (Kaushi) and five grand children (Preethi, Vikram, Adithi, Adarsh and Sarika). We will remember him and miss him, for his camaraderie, his benevolent friendship sans boundaries and the wholesome manner he touched our lives and scientific careers. We pray for Peace to him and for Strength to his family.

A. K. Singhvi, Y. S. Mayya, and B. C. Bhatt