

Professor Palliakaranai Thirumalai Narasimhan A Tribute



Palliakaranai Thirumalai Narasimhan – PTN to his friends and admirers in India, Jim to his colleagues in the West – has been quite a phenomenon on the Indian academic and scientific research scene. Born on July 28, 1928 in Cuddalore (New Town), Tamil Nadu, PTN's early academic career goes back to the Madras Christian College and then the Indian Institute of Science. This was followed by post-doctoral years in the US, especially with Max T. Rogers at Michigan State University. Subsequently PTN was Assistant Professor at Michigan State and at Columbia University. He then returned to India in 1962 and took up an Assistant Professorship in the Department of Physics, IIT Kanpur, soon moving on to the Department of Chemistry, where he went on to become Full Professor in 1965 and then Senior Professor.

Throughout his years at IIT Kanpur, from where he retired in 1988 – and indeed since then at the Huntington Medical Research Institute and later at the Beckman Institute, Caltech – Professor Narasimhan consistently demonstrated that you can do excellent science – and still enjoy doing it.

His chosen passions have been magnetic resonance and theoretical chemistry. He brought to both, perspectives that have been unique on the Indian scene and made him a pioneer. In his experimental research, he believed in developing scientific instrumentation and in his theoretical undertakings he never allowed mathematics to reach the point where it might distract him from the physical perspective.

With his research group at IIT Kanpur, he pioneered the development in India of dynamic nuclear polarization at X-band, both in terms of home-built instrumentation and chemical applications. Another important research area in his hands was NQR spectroscopy, culminating in home-built phase locked super-regenerative oscillator-detectors and a home-built pulsed NQR double resonance system. The high resolution NMR of small molecules dissolved in liquid crystalline media, and the investigation of alternating linewidth effects in ESR were other major undertakings of his group. PTN carried his fondness for working with scientific instruments to the point of reviving dead commercial spectrometers – the days spent reviving an A60D that had been given up being one example.

A considerable body of quantum chemical research emerged too from PTN's group. Much

effort was focused on MR parameters such as coupling constants in NMR, spin densities and relaxation models in ESR and quadrupole coupling constants employing VB and MO theories. His group also worked on Sternheimer shielding and anti-shielding factors, using Hartree-Fock-Slater approach, a precursor of density functional theory and molecular electron momentum densities. In all of this work, a good deal of code development was undertaken by his group, both within semi-empirical and *ab initio* frameworks.

In PTN's thinking about science, the black box approach was clearly anathema! In his inspiring lectures throughout the country, PTN brought alive this magical sense of *doing* things – and loving it!

It follows naturally that PTN built up an awesome reputation and received a series of accolades from the Indian Science establishment, including the Shanti Swarup Bhatnagar Prize, as well as the Fellowship of the Indian National Science Academy, the Indian Academy of Sciences and the National Academy of Sciences. His reputation was by no means confined to the shores of India, however; he had close working relationships with the leading magnetic resonance researchers and theoretical chemists of continental Europe, UK, USSR and the US.

PTN was the moving force behind the establishment of one of the earliest MRI facilities in India, at the Institute of Nuclear Medicine and Allied Sciences, New Delhi. To the surprise of many, however, he chose to resume his research in the US after retirement from IIT Kanpur.

At the Huntington Medical Research Institute and later at the Beckman Institute, Caltech, PTN has contributed significantly to biomedical NMR and to NMR microimaging.

In his personal life, Professor Narasimhan has been supported by Mrs. Leena Narasimhan for over forty years. His children Nalini, Vikram and Nandini are all doing very well in their chosen careers. PTN is an accomplished flautist who has given many recitals in India and abroad.

Arkivoc is privileged to salute such a unique personality – a connoisseur of science and of music and dance, a man with great personal charm and ready wit – for his outstanding contributions in teaching, in the development of scientific instrumentation and in researches into magnetic resonance and theoretical chemistry, with chemical and biomedical applications.

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Some recent publications of Prof. Narasimhan

- ³¹ P Saturation Transfer and Phosphocreatine Imaging in the Monkey Brain; Mora, B.B.; **Narasimhan, P.T.**; Ross, B.D.; Allman, J.; Barker, P.B. *Proc. Nat. Acad. Sci. (U.S.A.)* **1991**, 88, 8372.
- Magnetic resonance microscopy- challenges in biological imaging using a 500 MHz NMR

- microscope; **Narasimhan, P. T.**; Ghosh, P.; Frazer, S. E.; Jacobs, R. E. *Proc. Ind. Acad. Sci. (Chem. Sci.)* **1994**, *106*, 1625.
3. Neuroanatomical Micromagnetic Resonance Imaging; **Narasimhan, P. T.**; Jacobs, R.E. *Brain Mapping: The Methods* 1996, pp 147-167.
 4. MR imaging with phase encoding of intermolecular multiple-quantum coherences, Velan, S. S.; **Narasimhan, P. T.**; Jacobs, R. E. *J. Mag. Resonance* **2001**, *152*, 189.
 5. Small animal neuroimaging using magnetic-resonance microscopy; Ahrens, E.T.; **Narasimhan, P. T.**; Nakada, T.; Jacobs, R.E. *Prog. Mag. Resonance Spectr.* **2002**, *40*, 275.