

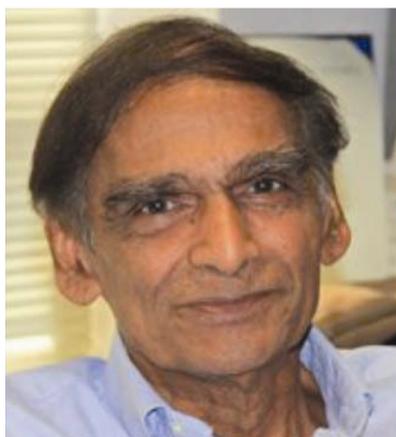
Tiruvalam Natarajan Krishnamurti (1932–2018)

Prof. Tiruvalam Natarajan Krishnamurti, a renowned tropical meteorologist, passed away in Florida, USA on 7 February 2018. In his academic career spanning 67 years, Krishnamurti played a key role in the transformation of tropical meteorology from a descriptive subject to one that used sophisticated numerical as well as observational techniques and powerful computers to make accurate predictions of tropical weather and climate. He was the Raman Chair Professor of the Indian Academy of Sciences, Bengaluru during December 1998–December 1999.

Krishnamurti was attracted to tropical meteorology while pursuing his Bachelor of Science and Master of Science degrees in physics at Delhi University during 1947–1951. He lived in a house close to India Meteorological Department (IMD), Lodhi Road, New Delhi. His interest in meteorology was kindled by his visits to a library at Lodhi Road. He was first exposed to the subject when he enrolled for his Master's degree in meteorology in Andhra University in 1951. He then decided to go to University of Chicago, USA for his doctoral work since it had the most renowned meteorologists in the world like Herbert Riehl, David Fultz, George Platzman, Eric Palmen and Ted Fujita. His doctoral thesis advisor was Riehl and his thesis topic was on the global mapping of the subtropical jet stream in winter. At the University of Chicago, he also met his future wife while taking a course together.

After completing his Ph D in 1960, Krishnamurti joined the Department of Meteorology at the University of California, Los Angeles. He was witness to the evolution of the concept of cooperative interaction between ocean and atmosphere proposed by Jacob Bjerknes in 1961. This led to an understanding of the relationship between the atmospheric phenomenon known as the southern oscillation and the oceanic phenomenon known as El-Niño. In 1965, Krishnamurti joined the Department of Meteorology at Florida State University, Tallahassee and contributed to the development of a thriving research centre for

the prediction of tropical weather and climate during the next 50 years. He showed that assimilation of observed rainfall in the numerical model improved the short-term forecasts. The limited area model that he developed at Florida State



University was used by IMD for many years for weather forecasting. In 1972, he highlighted the nature of the divergent east–west circulation in the tropics. He discovered the existence of westward-propagating easterly waves in the Atlantic Ocean. He was an active participant in major international observational programmes such as GATE and MONEX.

He became well known for the development of coupled ocean–atmosphere models to forecast tropical cyclones. He proposed the concept of multi-model ‘super-ensemble’ for improving the accuracy of forecast of the tracks of tropical cyclones and monsoon rainfall. The ‘super-ensemble’ differed from the traditional ensemble mean by not assigning the same weight to all the models. The models were weighted based on their performance during the training period. He was an active participant in the Tropical Rainfall Measurement Mission initiated by NASA to provide an accurate estimate of tropical rainfall. He was a mentor for the Laser Atmospheric Wind Sounder planned by NASA in 2019.

Krishnamurti has received many awards for his contributions to tropical meteorology. The American Meteorological Society conferred upon him the

Charney Award in 1974 and the Carl Gustaf Rossby Medal in 1985. Krishnamurti was an outstanding teacher who guided more than 100 Master's and doctoral students. Florida State University gave the Distinguished Professor award to him in 1985. He received the International Meteorological Organization Prize in 1996 from the World Meteorological Organization. The American Meteorological Society also held a special symposium in his honour in January 2012 on his 80th birthday. He wrote a book entitled *An Introduction to Global Spectral Modelling* in 1998 and another *An Introduction to Tropical Meteorology* in 2013.

A large number of Indian scientists visited his laboratory at Florida State University and gained valuable knowledge about complex interactions in tropical weather and climate. He mentored a large number of tropical meteorologists from all over the world, and his students headed weather forecasting centres in many countries in Asia and Africa. He visited India regularly and provided valuable advice to the National Centre for Medium Range Weather Forecasting, New Delhi. He was a member of the International Advisory Panel of the Ministry of Earth Sciences, Government of India. He contributed to the research initiated under India's ‘Monsoon Mission’ programme and was planning to take an active part in its second phase. Tropical meteorologists from all over the world will miss his physical insight, friendly smile and optimistic outlook.

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