

## V. Ramamurti (1938–2016)

Professor Viswanatha Ramamurti was born on 18 September 1938 at Annamalainagar, Tamil Nadu. He was a celebrated teacher, an excellent researcher and an industrial consultant par excellence. He pioneered industrial consultancy in the Department of Applied Mechanics at Indian Institute of Technology Madras (IIT/M), and helped the Department earn a name nationally for seismic vibration testing of industrial components. This was possible with the design and development of a double-mass exciter which was commissioned in the 1980s and which won the NRDC award for import substitution.

Ramamurti earned his M Tech from IIT Kharagpur in 1963, worked for KCP Limited, Madras from 1963 to 1966 and then joined IIT/M as Lecturer. He received his Ph D in 1970 from IIT/M and was promoted to Assistant Professorship. He became a professor in 1977 and retired in 2001. He also chaired the Department of Applied Mechanics from 1978 to 1981. Ramamurti also made substantial contributions to the IIT/M Senate proceedings, evincing commitment to academics. He continued to be academically active even after his retirement from IIT/M.

Ramamurti encouraged his colleagues to take up industrial consultancy, and brought in a vibrant culture of solving industrial problems as part of normal work at IIT/M. This had a great effect in his teaching, which, unlike the usual mathematical development, had a lot of practical insights that he gained from solving a variety of engineering problems faced by Indian industry. For any problems dealing with vibration issues, industries used to flock to him for advice and practical solutions. His stint at KCP Limited in the sixties taught him the need for providing solutions in a timely manner for use by industries.

Ramamurti addressed complexities in practical units like kilns, large-sized fabricated gears, cement mills, circuit breakers, space frames, bus ducts, bus bodies, rail bogies, machine tools like guillotine shears, hydraulic presses, plate bending rolls, press brakes, multilayered pressure vessels and centrifugal baskets. His research involved development of efficient algorithms for solving complicated simultaneous equations, optimiza-

tion of bandwidth, etc. to solve difficult problems with limited resources. He pioneered the use of cyclic symmetric analysis to a wide range of units, such as impellers, gear wheels, turbochargers, turbine blades and discs. In addition to numerical simulations, experimental investigations at the site to verify the findings of the units investigated were the success of his activity. His contributions to industrial consultancy brought rich dividends to the industries concerned. In one instance he could increase the productivity of a paper mill owned by a large industrial house in India by re-designing the roller supports, thereby reducing the vibration velocity from 130 to just 2 mm/s. In another instance, he re-designed the drive housing of a fibrizer of a sugar factory, which brought down the vibration velocity from 20 to 5 mm/s and helped to increase the sugarcane crushing volume per season. Likewise one could cite several instances of success in his consultancy career. He was awarded the VASVIK Industrial Research award in 1983.

Ramamurti enjoyed problem-solving and was a retainer consultant to 12 well-established Indian industries for over 40 years, in the area of heavy engineering, process, power and automobile sectors. He was extensively consulted in the areas of stress analysis and vibrations by industries. Even after retirement, he continued to be active in industrial consultancy.

Ramamurti was known for his bubbling energy and spent most of his time guiding students, teaching and solving

industrial problems. In all, he has guided 25 students for their doctoral degrees and has authored more than 185 papers in international journals. He toured remote corners of the country to fix any problems regarding on-site vibration issues. Despite a busy schedule, he used to teach three full courses each semester with a large number of students. He was prompt in correcting exam papers and giving the grades, and set an example for others on time management. He was commended by the IIT Board as one of the best 12 teachers of IIT/M in 1976. He used to attract the best talent across the institute for B Tech projects. Thus his span of activity covered all aspects of an excellent academic to be quoted as an example for others to emulate.

Until the mid-1980s Ramamurti was fully devoted to teaching and industrial consultancy. In 1984, he floated a new elective course on computer-aided design which was a major hit among the students. His first textbook *Computer-Aided Design* came to fruition in 1987 based on his class notes. One of the present authors also had the privilege of coordinating the numerous software codes that formed part of the book. The book was well received by the community – reprinted in 1989, enlarged and revised as *Computer-Aided Mechanical Analysis and Design* in 1992, revised in 1996 and reprinted in 1988. The US edition of the book by McGraw-Hill was brought out in 1998, which was subsequently revised in 2000. The book has a unique chapter on cyclic symmetry, which is a boon for



V. Ramamurti receiving his 'Distinguished Alumnus Award of IIT Kharagpur 2012' from President Pranab Mukherjee.

solving several mechanical engineering structures conveniently with limited resources. Many of his students have done research on this topic and have made notable contributions.

Ramamurti was decorated with several awards and honours which include NRC Senior Research Award of NASA, USA to work at the NASA Lewis Research Centre, Cleveland (1981). He was elected Fellow of the Indian National Academy of Engineering (1989), Indian National Science Academy (1990) and Indian Academy of Sciences (2010); the Syed Husain Zaheer Medal (1995); Honorary Life Member, Association of Machines and Mechanisms (1996); INSA Biren Roy Award (2007), and Distinguished

Alumnus Award of IIT Kharagpur (2012). It is to be noted that he was the first engineering faculty to be elected to INSA from IIT/M. To maintain and encourage high standards in Ph D dissertations, the 'Prof. V. Ramamurti Award for Best Ph D thesis in Applied Mechanics' has been instituted at the Department of Applied Mechanics at IIT/M since 2008.

Ramamurti became a prolific writer after his retirement from IIT/M. He wrote four books and all of them had a second revised edition, indicating the popularity and utility of his textbooks. By writing such classic textbooks, Ramamurti has rendered yeoman service to the field of mechanical engineering internationally.

All of Ramamurti's students have occupied important academic and administrative positions across the world. He will be remembered as a great teacher, most sought after author, and an affordable and successful industrial consultant par excellence.

Ramamurti is survived by his wife, son and daughter.

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## M. A. L. Thathachar (1939–2017)

Professor Mandayam Ananthpillai Lakshmi Thathachar, an extraordinary teacher and researcher, passed away on 7 January 2017 at his home in Bengaluru.

Thathachar, fondly referred to as MALT by his students, spent most of his academic career at the Indian Institute of Science (IISc), Bengaluru. Over a time-span of nearly four decades, he initiated and nurtured research at IISc in the then emerging areas of adaptive control, pattern recognition and machine learning, which are areas of utmost importance in industry today. He had mentored a generation of researchers in these areas. Many of his students are currently senior professors in universities across India, USA and Canada. All of them cherish the time they spent working with him.

Thathachar was born in Mysore on 20 May 1939. He obtained his BE degree in electrical engineering from the University of Mysore, where he stood first and was awarded the Bowen Memorial Prize. In 1961, he obtained his ME degree in electrical engineering from IISc. Later, he worked as a lecturer at the Indian Institute of Technology – Madras, during 1961–1964. In 1964, he rejoined IISc as a lecturer in the Department of Electrical Engineering and obtained his Ph D from the same Department in 1968. He became a full professor at IISc at a relatively young age of 39 years and retired from service in 2001. Apart from the

significant research contributions that he made while at IISc, he also held many administrative positions in the Institute, including being the Chairman of the Department of Electrical Engineering



(1983–1988); Chairman, Senate Curriculum Committee (1990–1992) and Chairman, Division of Electrical Sciences (1992–1996). He had also held visiting positions at many universities, including Yale University, Michigan State University, Concordia University, University of Liverpool, and National University of Singapore.

During the early part of his career, Thathachar's research was focused on the development of novel frequency domain criteria for the stability of a variety of nonlinear and time-varying feedback systems. He applied the stability results to the design of adaptive systems and formulated an elegant structural criterion for the adjustment of gains which simultaneously assures boundedness of all the signals in the system.

Later, he moved away from adaptive control and for more than half of his career concentrated on the design and analysis of a class of mathematical models of learning algorithms called learning automata. Thathachar made fundamental contributions to the theory and practice of learning automata. He was among the very first researchers to foresee the importance of studying mathematical models of learning much before it became fashionable and much before today's hype about machine learning. Learning automata represent elegant models of choice-making behaviour of adaptive agents and these models are the precursors to today's reinforcement learning agents.

His survey paper in 1973 on these models was influential in the field. He provided a firm mathematical foundation for the design of learning algorithms for such automata-based learning systems. The concepts of absolute expediency,