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.

K. RAMESH[1]
P. T. MANOHARAN[2,*]

[1]Department of Applied Mechanics and
[2]Department of Chemistry,
Indian Institute of Technology Madras,
Chennai 600 036, India
*e-mail: ptm@iitm.ac.in

M. A. L. Thathachar (1939–2017)

Professor Mandayam Ananthampillai 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,

discretization and the class of estimator algorithms developed by Thathachar along with his students were significant and fundamental contributions to the field. He developed novel classes of learning algorithms and also developed mathematical techniques for interconnecting many learning automata to form what can be viewed as a class of stochastic neural networks. The algorithm that he and his students developed for learning Nash equilibria in stochastic games is among the first algorithms for learning Nash equilibria. He co-authored, along with K. S. Narendra (Yale University) a book entitled *Learning Automata*, the first one in the field. He later co-authored another book, *Networks of Learning Automata*. He was also involved in exploring many applications of learning automata-based algorithms for problems such as routing in communication networks.

Thathachar was an inspiring teacher. He used to enthuse and motivate his students to learn many topics of current research. As early as 1976, when the field was still in its infancy, he taught a course on statistical pattern recognition at IISc. His ability to make many of the mathematically intricate concepts in systems theory, probability, learning theory, etc. easily understandable to novice students is something that is legendary among the generations of students taught by him at IISc. He was a gentle person and used to be really affectionate towards all his students.

Thathachar received many accolades and awards in recognition of his research work. He is among the first few researchers from India to be elected Fellow of the Institution of Electrical and Electronics Engineers (IEEE). He was a Fellow of the Indian National Academy of Engineering, the Indian Academy of Sciences and the Indian National Science Academy. He received the Alumni Award for Excellence in Research at IISc and was also honoured with the prestigious Distinguished Alumnus Award of IISc.

With his demise the research community has lost a senior researcher in learning algorithms and all his students have lost a father figure whom they will continue to look up to. Thathachar is survived by his wife, son and daughter.

P. S. Sastry[1,*]
B. J. Oommen[2]

[1]*Department of Electrical Engineering, Indian Institute of Science, Bengaluru 560 012, India*
[2]*School of Computer Science, Carleton University, Ottawa, Canada*
*e-mail: sastry@ee.iisc.ernet.in