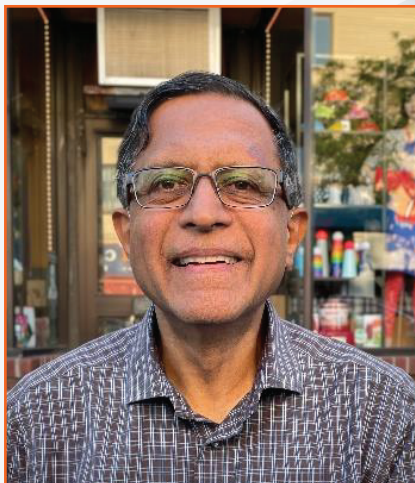Department of Computer Science and Automation Indian Institute of Science, Bengaluru

PROF. V.V.S. SARMA MEMORIAL LECTURE

Models of Simplicity

Encounters in Power Systems, Power Electronics, and Physiology

Prof. George Verghese

Henry Ellis Warren (1894) Professor of Electrical and Biomedical Engineering Massachusetts Institute of Technology, Cambridge, Massachusetts, USA

Abstract: Professor V.V.S. Sarma ("VVS") and his collaborators and students used, extended, and applied pattern recognition and machine learning/AI ideas and methods in a variety of areas, starting in the mid 1970's, but his interests expanded beyond: he wrote that "while my thoughts were on the philosophy of AI, my students were working on engineering aspects of AI and incorporation of AI ideas in system design." The VVS group's applications of AI in each domain – whether for speaker recognition, aircraft maintenance protocols, computer system reliability, hot forging processes in metallurgy, or remote sensing – were built on careful understanding of the application area (he refers to hours of "domain knowledge elicitation sessions"), to extract and exploit appropriate models for system design. I began my academic career with a grounding similar to VVS's, in electrical engineering, and subsequently dynamic systems, control theory, and signal processing. Power systems and power electronics were my focus for 20+ years, but a sabbatical at a Boston hospital marked a switch to "computational physiology" for clinical inference. I seem to have landed in particular applications in these domains where the most elementary models have been disproportionately insightful and effective (with only tangential help from machine learning), and I will talk about these.

Biosketch: George Verghese earned his BTech from IITM in '74, his MS from Stony Brook University in '75, and his PhD (under Prof. Thomas Kailath) from Stanford in '79, all in electrical engineering. He has been with the EECS Department at MIT ever since, where he is a chaired professor of electrical and biomedical engineering, and has won treasured MIT-wide awards for undergraduate education and for mentoring. He is an IEEE Fellow, and coauthor of Signals, Systems and Inference (2015, with Oppenheim) and Principles of Power Electronics (2nd edition, with Kassakian, Perreault and Schlecht, publication mid-2023, a mere 32 years after the 1st edition).

Prof. Rajesh Sundaresan, Dean, Division of EECS, will preside

Date: January 13, 2023 [Friday]; Time: 4:00PM

Venue: CBR Auditorium, First Floor, Centre for Brain Research, IISc Campus

Professor V.V.S. Sarma

(May 1944 – January 2018)

Professor Vallury Subrahmanya Sarma, an extraordinary teacher and researcher, passed away on 13th January 2018 at his home in Bangalore. He is survived by his wife Mrs. Subbalaxmi and three daughters Vijaya, Janaki, and Aruna. Professor V.V.S. Sarma was born on May 7, 1944 in Vijayawada. After graduation with a University gold medal in Mathematics, Physics and Chemistry (called MPC) from Andhra University in 1961, he obtained his BE, ME, and PhD degrees from IISc, Bangalore. He served the IISc as a faculty member in CSA and ECE departments from 1967. He became a full professor in 1983, and continued his service until his retirement in 2006. He was a visiting Professor at the University of Southwestern Louisiana, USA between1984-86 and at the Tata Research Development and Design Centre, Pune between 1995-97. He was elected to the fellowships of Indian Academy of Science, Indian National Science Academy and Indian National Academy of Engineering. Post retirement, he was an Honorary Professor in CSA and an INAE Distinguished

Professor. Professor V.V.S. Sarma fondly called VVS by his students and friends, spent most of his academic career at the Indian Institute of Science (IISc), Bangalore. Over nearly four decades, he initiated research at IISc in the then emerging areas of reliability engineering, pattern recognition, artificial Intelligence and machine learning, which are areas of utmost importance in the industry today. He has advised a whole generation of researchers in these areas. His students were drawn from CSA, ECE, Aerospace, Mathematics and Metallurgy departments and engineers from organizations such as IAF, NAL, ISRO, DRDO, BHEL under the external registration program. Many of his students are currently senior professors in universities or senior engineering researchers in DRDO and ISRO across India, USA, and Canada. With his professional friends N. Viswanadham and M.G. Singh, he co-authored a book Reliability of Computer and Control Systems published by North-Holland Systems and Control series in 1987. He co-edited the book "Artificial Intelligence and Expert Systems in Indian Context," published by TataMcGraw-Hill, 1990 jointly with N.Viswanadham, B.L.Deekshatulu, and B. Yegnanarayana. Prof. VVS Sarma was a very inspiring teacher. He enthused and motivated 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 Artificial Intelligence at IISc. He was gentleness personified and used to be affectionate towards all his students. In his passing away, the research community has lost a magnificent mentor, brilliant researcher and an outstanding teacher. All his students have lost a father figure whom they continue to look up to.