



UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

Memorial Tribute to

SUBBARAYAN PASUPATHY

Professor Emeritus

The Edward S. Rogers Sr. Department of Electrical & Computer Engineering

April 26, 2023

Be it resolved –

THAT the Council of the Faculty of Applied Science & Engineering record with deep regret the death on February 12, 2023 of Professor Subbarayan Pasupathy

Professor Subbarayan Pasupathy, affectionately known as Pas, was born in Chennai, India, on September 21, 1940. His Indian heritage was always a source of pride to him, and later he would attribute his success as a researcher and teacher to the culture he inherited.

Pas was greatly loved by his wife Jaya Pasupathy and his daughter Vani Pasupathy. She and her husband, Suneil Sastri, have a son — Pas’s grandson — Jayen Sastri.

In 1963, Pas earned his bachelor’s degree in Telecommunications from the College of Engineering (now known as Anna University) in Guindy, Chennai, on the southwest coast of India. In 1966, he graduated with first rank in the first batch of M.Tech. students at the Indian Institute of Technology (IIT), Madras, continuing to work there as a research scholar and part-time lecturer.

In the late sixties, he moved to the United States to continue his studies at Yale University, receiving the M.Phil. and PhD degrees in engineering and applied science in the area of array processing of sonar signals. He worked as a Teaching Assistant in his time at Yale and in 1972 completed his doctoral dissertation under the supervision of Professor Peter Schultheiss.

Pas arrived in Canada as a postdoctoral fellow in 1972 to continue his work in sonar at the University of Toronto, and in 1973 joined the faculty as part of its Communications Group. From 1979 to 1982 he served as Associate Chair of what was then the Electrical Engineering Department and became a full professor in 1983. For many years, Pas was Chair of the Communications Group — or “gentle orchestrator,” as Professor Alberto Leon-Garcia says, of the three-member group that today numbers nearly two dozen faculty members. Pas’s academic career spanned more than 35 years in undergraduate teaching and research at U of T.

Pas's early research interests were in active and passive sonar systems. His curiosity and talent led him to work in many areas throughout his career, eventually becoming an international authority on the application of statistical communication theory and techniques to the design of digital communications systems. He contributed to more than 275 articles and three books, and was the first Canadian professor in communications to be listed in ISI Web of Knowledge's prestigious "highly cited researchers" list. His contributions have been cited in more than 100 patent applications.

His specific area of expertise was on the theory and applications of "correlative coding," more commonly known as "partial-response signaling," and he wrote a highly cited article on this in 1975. But his interests were vast: continuous-phase modulation, minimum-shift keying, error-rate monitoring in line codes, trellis coded modulation, Nyquist's criteria, delay estimation, fading channels, and many other topics. His research over the years had a wide variety of applications, including array processing, computer algorithms for signal processing, advanced transceiver structures, mobile cellular networks, and coding algorithms and architectures. In collaboration with colleague Professor Frank Kschischang, he discovered the densest known lattice packing of 36-dimensional spheres, known as KP36 or the "Kschischang-Pasupathy lattice": "I am proud to say that his name and mine will forever be intertwined," says Professor Frank Kschischang.

In addition to teaching and research, Pas served as an editor for a number of IEEE journals as well as the Canadian Electrical Engineering Journal, notably coordinating the special IEEE issue on "Canadian Telecommunications" in 1981. In 1991, Pas was elected Fellow of the IEEE and he received the 2003 Canadian Award in Telecommunications Research from the Canadian Society of Information Theory. He was elected Fellow of the Engineering Institute of Canada in 2004 and Fellow of the Canadian Academy of Engineering in 2007.

Pas's curiosity and creativity extended beyond technical subjects. He had numerous hobbies which excelled at: Tamil scholar, artist, poet, musicologist and storyteller. It was not a surprise to those who knew of his love of wordplay that he started a humour column for IEEE titled *Light Traffic*, which he continued to publish for over 14 years. He particularly enjoyed creating palindromes related to his technical interests, introducing a character, Dr. O. Lord, first name Otto, who only spoke in palindromes and was an expert in, you guessed it, "radar." In these articles, Pas mused about metrics, made jokes about codes, created quizzes and games. Pas said he saw his column as "declarations of the endless challenge and personal happiness I have discovered in the fascinating world of words." To find humour in the subject most dear to you is an expression of your love for it.

In May 2007, a workshop in honour of Professor Pasupathy was held at the University of Toronto. The many colleagues, former students and postdocs in attendance attest to his great impact on the ECE community, and he received a standing ovation after his closing speech on what it means to do research. The following year, the IEEE published a number of profiles of him

in various publications. In April 2010, he was honoured by his alma mater IIT Madras as a Distinguished Alumnus, and in 2019 he won a Lifetime Achievement Award from *Tamils' Information Magazine*.

Pas was universally beloved by his colleagues. Described as “a deep well of wisdom and friendliness,” by Professor Jonathan Rose, he was always open to a chat or to dispense advice to junior faculty. He instructed Professor Ravi Adve, early in his academic career, on how to set up a research program in Canada, offering to pay for and co-supervise a student or two, saying, "Do not worry about the money. We will collaborate and make sure you can get started." There was the time that he called Professor Shahrokh Valaee into his office to say, "You are new here and will need a few good books" and gave him hard-to-find textbooks that Professor Valaee uses frequently to this day. And ECE staff could always count on him for a kind smile, a word of wisdom — and a Garfield joke.

In addition to his mentorship of so many faculty members, one of his lasting accomplishments is the great number of graduate students and postdoctoral students he trained, who were fortunate to benefit from his insights and passion and who have gone on to distinguished academic and industry careers of their own. How many PhD theses and papers began as sketch or equation that Pas scribbled!

Pas's warmth and smile was a beacon to all. A beloved husband, father, community leader and distinguished academic, his impact in our department is immeasurable. His wise, brilliant, gentle and humorous nature will be much missed by all who interacted with him and will be deeply felt by the many who cherished him as a friend.

Be it further resolved –

THAT this tribute to Professor Subbarayan Pasupathy be inscribed in the minutes of this Council meeting, and that copies be sent to his family as an expression of the respect and gratitude of the members of this Council.

Prepared by Professor and Chair Deepa Kundur; Professors Frank Kschischang, Wei Yu, Ravi Adve, Hoi-Kwong Lo, Jonathan Rose, Alberto Leon-Garcia, Elvino Sousa, Safwat Zaky, Khoman Phang, Shahrokh Valaee, George Eleftheriades, Konstantinos Plataniotis; and Ms. Diane Silva