



## **Prof. Dr. A.V. Balakrishnan**

December 4, 1922 - March 17, 2015

The IFIP community is deeply saddened by the unexpected departure of A.V. Balakrishnan, who passed away at his home on March 17, 2015. He was a Distinguished Professor Emeritus and Research Professor in the Department of Electrical Engineering, while holding also for many years an appointment in the Department of Mathematics. He served in the faculty of the University of California Los Angeles (UCLA) for more than 50 years. Among other appointments, he was the chair of the Department of System Sciences at UCLA for two terms, starting in 1969.

Throughout his brilliant career, he has been recognized as an icon of modern communication theory and modern control theory, before dedicating himself, in the last several years of his prolific research activities, to the theory of continuum aero-elasticity. These efforts ultimately converged into the publication of his 2012 Springer-Verlag mega treatise entitled: *Aeroelasticity-Continuum Theory*. In it he collected the product of his own independent, physics-grounded research, building upon the masters of the past, to construct a mathematical theory of continuum aero-elasticity that would complement and substantiate the computational fluid dynamics approach.

In fact, the thread that linked all his broad scientific activities was mathematics. From his revolutionary and highly influential PhD dissertation on fractional powers of operators, written under mathematical giant Ralph Phillips in 1954 at the USC; to his contributions in both deterministic and stochastic control and communication; to his ingenious Springer Verlag book on Applied Functional Analysis of 1976 and 1981, written with focus on stability theory, optimal control theory and stochastic optimization for systems defined by operator semi-groups, one of his favorite topics; all the way to the last phase of his research activities in continuum aero-elasticity.

Of gentle and well-disposed personality, ready to help junior faculty and students, he had a very unique maverick approach to science and life in general, while keeping a strong sense of independence: of mind, of spirit, of action. Indeed, during the severe stages of the cold war, he was able to maintain

scientific contacts with the former Soviet Union by inviting Soviet mathematicians such as Pontryagin and others to visit UCLA.

With Pontryagin, J.L Lions and S. Marchuk, he funded the Springer-Verlag journal *Applied Mathematics and Optimization* and gave birth to IFIP's TC7 Committee on Modeling and Optimization which was spearheaded simultaneously in Rome (Lions and Bal) and Moscow (Marchuk and Pontryagin) in 1963. Following his role as a co-founder of TC7, he wholeheartedly continued to support the international image and broad range activities of TC7 with particular contributions to WG 7.1 and WG 7.2.

Bal, as he was known to everyone, was the recipient of many outstanding awards: Life Fellow of IEEE in 1996; the NASA Public Service Medal in 1996 for his “exceptional continuous theoretical and administrative contributions in establishing the UCLA-NASA Flight Systems Research Center”; the Richard Bellman Control Heritage in 2001 - the highest professional achievement award given to control systems engineers and scientists - for his contributions to the theory and application of automatic control from the American Automatic Control Council (AACC); the Distinguished Alumni Award in Academia from the University of Southern California (USC) Viterbi's School in 2004. He has also received honors and awards from the International Federation of Information Processing Society (1977), from NASA (1978, 1992, 1995, and 1996), and, in 1980, the Guillemin Prize in recognition of the major impact that his original contributions have had in setting the research direction of communications and control.

Professor Balakrishnan also holds patents on the “modes of interconnected lattice trusses using continuum models”, and “laser beam log amplitude temporal scintillation spectrum due to crosswind”.

The IFIP community mourns an icon, a colleague, and a friend.

Bal is survived by his steadfastly supportive and beloved wife Sonya and five children.

On behalf of TC7,

Irena Lasiecka, Vice Chair TC7

Lukasz Stettner, Vice Chair TC7

Fredi Tröltzsch, Chair TC7