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Aldo Belleni-Morante (1938-2009), Obituary

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Aldo Belleni-Morante (1938–2009)



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Aldo Belleni-Morante was born on 22 January 1938 in Florence (Italy), a beautiful Tuscan town to which he remained faithful for almost all of his life. As in the case of many prominent Italian Applied Mathematicians, his early research was not in mathematics: he received his first degree, *Laurea*, from the University of Florence, having presented a thesis on Neutron Diffusion and Transport in Multiplying Media. The research which followed was centred on this topic and developed from it, when he had short-term appointments at CNEN (Italian Atomic Energy Agency) in Bologna and the Computing Center of the Mathematical Institute of the University of Florence. In 1963 he was appointed as an assistant professor of Classical Mechanics at the University of Florence.

Later he spent two years, 1968 and 1969, as a NATO fellow at the Physics Department of the University of Illinois, Urbana, USA, before returning to Florence to become *Professore Ordinario* of Classical Mechanics (equivalent to habilitation and *Lehrstuhl* in Germany) at the University of Florence. In 1971 he won the competition for a Full Professor in Bari where he stayed until 1973 when a professorial position became available in Florence. In the University of Florence he occupied positions of Full Professor of Classical Mechanics and, later, of Continuum Mechanics. In 2005 he was appointed as the Coordinator of the PhD School of Civil Engineering, Environmental Risk and Building Materials. He worked there till his untimely death in 2009.

As we mentioned earlier, Aldo's early work was related to the more physical aspects of neutron transport. Later he moved on to more mathematical questions. However, the interest in physical origins of the problems became one of the hallmarks of his research: while able to achieve brilliant theoretical results, he always sought their physical relevance and dismissed the creation of theory just for the sake of it. Another hallmark of his work was to look for the underlying simplicity in nature, best expressed by mathematics. It was his first physical topic—neutron diffusion and transport—that prompted him to recast the beautiful but abstract theory of semigroups of operators in a way suitable for describing the evolutionary physical phenomena. His book on this topic, *Operator Semigroups and Applications* (Clarendon Press: Oxford, 1979) preceded, by a few years, other classical treatises on this topic and has remained a basic reference for anybody interested in the application of operator semigroups.

An interest in applied semigroups continued to be a defining trait of Aldo's scientific work. He published numerous papers on this topic as well as two other books, *Operator Semigroups and Applications* (World Scientific: Singapore, 1994), and *Operator Semigroups and Applications* (together with Adam C. McBride; Wiley: Chichester, 1998).

His focus was on existence and regularity problems for the evolution equations in Banach spaces, which were motivated by real-life problems such as photon transport, as well as fragmentation and coagulation processes, in interstellar clouds, transport in time-dependent domains, problems with non-homogeneous boundary conditions, realistic traffic models, Boltzmann-like schemes with outgassing and contamination, models suggested by biological phenomena such as the growth of human temperature and gamma ray transport in cardiac regions.

In the best tradition of mathematical physics, he developed new mathematical tools to cater for physical problems. For instance, his research on multiplying boundary conditions in transport theory led to the creation of the notion of β -bounded semigroups which, as a special type of regularized semigroups, were widely recognized as Aldo's first important new concept in pure mathematics and have already led to several interesting developments.

