Preface to the Special Issue
on Fuzzy Sets in Dealing with Imprecision and Uncertainty: Past and Future
Dedicated to the memory of Lotfi A. Zadeh

In 1965, Prof. Lotfi Zadeh published a seminal paper entitled "Fuzzy sets" where he extended Cantor's classical set theory to a model in which a concept of classical membership or non-membership in a set is replaced by a notion of degree of membership.

Nowadays, fuzzy set theory is not only about extending the notion of a set or bringing a non-fully formalized knowledge into a scientific framework - it is about freedom in thinking, breaking boundaries and limitations and a deep respect to foundations of science. The concept of fuzziness ("everything is a matter of degree" to quote Zadeh) opens new horizons to many scientific areas: it extends multi-valued logic with additional connectives and quantifiers, algebra with plenty of lattice-ordered algebraic systems, topology with weak notions of closeness and openings, measure theory with non-additive measures, functional analysis with fuzzy-valued functions and fuzzy transforms, etc. Fuzzy set theory became a powerful technical tool in many applications: traditionally, in dynamic systems, control, decision-making, robotics, expert systems, automated reasoning; contemporarily, in machine learning, image and signal processing, data analysis, recommendation systems, and many-many other topics.

In this special issue, we have selected articles from a wide range of areas mentioned above and invited renowned experts in their fields. Referring to Zadeh's ideas, they provide a brief overview of what has been achieved in their research area, report key findings, and discuss the future. All these contributions show that the idea brought to the world by Professor Zadeh fell on the proper ground, and a number of the developed theories have significantly moved science forward.

We thank all authors for their enthusiasm and deep respect for the memory of Professor Lotfi Zadeh. This mark of respect is also the main motivation for the guest editors - friends of Professor Lotfi Zadeh and his followers. We thank Professor Fikret Aliev for his initiative and support for all our proposals and solutions.

Guest Editors:

Prof. Irina Perfilieva
Prof. Didier Dubois
Prof. Etienne E. Kerre
Prof. Witold Pedrycz