SPECIAL ISSUE ON MEMBRANE COMPUTING

Seventh Brainstorming Week on Membrane Computing

The present volume contains a selection of papers resulting from the Seventh Brainstorming Week on Membrane Computing (BWMC7), held in Sevilla, from February 2 to February 6, 2009. The meeting was organized by the Research Group on Natural Computing (RGNC) from Department of Computer Science and Artificial Intelligence of Sevilla University. The previous editions of this series of meetings were organized in Tarragona (2003), and Sevilla (2004 – 2008). After the first BWMC, a special issue of *Natural Computing* – volume 2, number 3, 2003, and a special issue of *New Generation Computing* – volume 22, number 4, 2004, were published; papers from the second BWMC have appeared in a special issue of *Journal of Universal Computer Science* – volume 10, number 5, 2004, as well as in a special issue of *Soft Computing* – volume 9, number 5, 2005; a selection of papers written during the third BWMC has appeared in a special issue of *International Journal of Foundations of Computer Science* – volume 17, number 1, 2006); after the fourth BWMC a special issue of *Theoretical Computer Science* was edited – volume 372, numbers 2-3, 2007; after the fifth edition, a special issue of *International Journal of Unconventional Computing* was edited – volume 5, number 5, 2009; finally, a selection of papers elaborated during the sixth BWMC has appeared in a special issue of *Fundamenta Informaticae* – volume 87, number 1, 2008.

Membrane computing is an area of natural computing which studies models of computation inspired by the structure and functioning of living cells, and organization of cells in tissues and other structures. The resulting models (called P systems) are distributed parallel computing devices, processing multisets in compartments defined by membranes. Most classes of P systems are computationally universal and, if an exponential working space can be produced in polynomial time (e.g., by membrane division), then they are able to solve computationally hard problems in a feasible time. A series of applications were recently reported, especially in biology and medicine, but also in computer graphics, cryptography, linguistics, economics, approximate optimization, etc. Several simulation programs (useful in applications) are available by now. A comprehensive information about this research area (considered in 2003 by ISI as "fast emerging research front in computer science") can be found at the website `http://ppage.psystems.eu`.

At this web address one can also find the volumes published after each BWMC, with the papers resulting from these meetings, including the volume with all papers related to BWMC7.

For the present volume we have selected only a few of these papers; they have been thoroughly reworked after the meeting and then they went through the standard refereeing procedure of the journal. The selection also intended to provide a good image of the research in membrane computing, so that the volume contains both theoretical and applicative papers, dealing with computing power, computational complexity, "classic" cell-like P systems and the recently introduced spiking neural P systems, programming, simulation of biological processes, and so on.

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The present volume is dedicated to the 60th birthday anniversary of Professor Mario de Jesús Pérez-Jiménez, the head of the Research Group on Natural Computing from Sevilla University, and one of the most active researchers in membrane computing. A really unique combination of enthusiasm and mathematical talent, of scientific devotion and altruism, Mario not only contributed a lot to the research in membrane computing, with fundamental results especially related to computational complexity issues and also related to many other theoretical research questions, to applications in biology and eco-systems, to programming, etc., but he also created one of the strongest research groups in natural computing in general, in membrane computing in special; it also deserves to be mentioned the organization, for already several years in a row, of the Brainstorming Week on Membrane Computing – all these making Sevilla a place of current "pilgrimage" of researchers in membrane computing, from Europe, Asia, America.

For all those who know Mario personally, it is hard to believe that he has already six decades: he is so active, enthusiastic and hard working that he looks as young as decades ago, and the theoretical possibility to get retired (according to Spanish regulations, this is possible for Mario) looks like a non-sensical joke... And, for all who know Mario personally, it is impossible not to own to him a lot, from science to daily life (one of the sayings which circulate around is that if you have a need, it is wiser not to tell it loudly, because Mario will try immediately to help you...).

Happy Birthday, Mario, and many happy returns!

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Guest Editors:
Giancarlo Mauri, Milan, Italy
Gheorghe Păun, Bucharest, Romania
Agustín Riscos-Núñez, Seville, Spain
(Sevilla, June 2009)

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