



Pre-Proceedings of Asian Conference on Membrane Computing (ACMC 2012)

Huazhong University of Science and Technology

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Wuhan, China





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Editors

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Foreword

Membrane computing (MC) is a branch of natural computing, initiated in [5], aiming to abstract computing models from the structure and the functioning of the biological cell, as well as from the cell cooperation in tissues, populations of cells, in the brain. The obtained models are currently called P systems. The research in this area developed very fast, both towards theory – especially, Turing computability, language and automata theory (e.g. many characterizations of Turing computability were found), computational complexity (e.g., polynomial solutions to **NP**-complete problems were proposed in terms of P systems able to trade-off time and space) and applications (especially in biology and bio-medicine, but also in other directions: computer graphics, approximate optimization, robot control, cryptography, ecology and economics modeling). Already in 2003, Thomson-Reuters Institute for Scientific Information, ISI, considered MC as an “Emergent Research Front in Computer Science”, with [5] considered a “fast breaking paper”, see <http://esi-topics.com>.

In 2000, a series of international meetings dedicated to MC was initiated, the *Workshop on Membrane Computing*, WMC. The first three editions of WMC were organized in Curtea de Argeş, Romania – in August 2000 (with the proceedings published in *Lecture Notes in Computer Science*, volume 2235), in August 2001 (with a selection of papers published as a special issue of *Fundamenta Informaticae*, volume 49, numbers 1–3, 2002), and in August 2002 (with the proceedings published in *Lecture Notes in Computer Science*, volume 2597). The next six workshops were organized in Tarragona, Spain (in July 2003), Milan, Italy (in June 2004), Vienna, Austria (in July 2005), Leiden, The Netherlands (in July 2006), Thessaloniki, Greece (in June 2007), and Edinburgh, UK (in July 2008), with the proceedings published in *Lecture Notes in Computer Science*, Springer-Verlag, as volumes 2933, 3365, 3850, 4361, 4860, and 5391, respectively. The tenth workshop returned to Curtea de Argeş in August 2009 (LNCS volume 5957).

From then on, the workshop became a conference and the series of meetings on membrane computing continues as *Conference on Membrane Computing*, CMC, with the 2010 edition, CMC11, held in Jena, Germany (LNCS 6501), CMC12 in Paris, France (LNCS 7184), and CMC13 in Budapest, Hungary (CMC14 will be held in Chişinău, Moldova).

Starting with 2003, also a second yearly meeting was organized, the so-called *Brainstorming Week on Membrane Computing*, BWMC, mainly dedicated to cooperation between participants.

The bibliography of the domain counts at this moment many titles; [6] and [7] are recommended as key references for general MC topics. More specific topics, like the connection between MC and process calculi [1], the interplay between MC and DNA computing [4], and conformon MC systems [3], are also well-established. Applications of MC in various areas can be found in [2]. An up-dated information can be found at the MC website from [8].

Because both the previously mentioned yearly meetings are organized in Europe and because there are many researchers working on MC in other places of the world, in particular, in Asia, the idea of organizing a dedicated meeting in Asia arose, and in this way the *Asian Conference on Membrane Computing*, ACMC, occurred.

ACMC 2012 was organized in Wuhan, P.R. of China, from October 15 to October 18, 2012, by Huazhong University of Science and Technology.

Five invited talks were presented, by Marian Gheorghe, Alberto Leporati, Francisco J. Romero-Campero, Xiangxiang Zeng, and Gexiang Zhang; two tutorials were delivered by Alberto Leporati

and Francisco J. Romero-Campero. Furthermore, 15 regular papers were presented.

The present volume contains all these papers, as well as abstracts of the invited talks.

The Program Committee consisted of the following 26 members: Henry Adorna, Matteo Cavaliere, Haiming Chen, Erzsébet Csuhaj-Varjú, Xiaoju Dong, Rudolf Freund, Pierluigi Frisco, Marian Gheorghe, Liang Huang, Florentin Ipate, Alberto Leporati, Vincenzo Manca, Atulya Nagar, Shankara Narayanan Krishna, Radu Nicolescu, Taishin Y. Nishida, Linqiang Pan, Gheorghe Păun, Mario J. Pérez-Jiménez, Ibrahim Venkat, Yasubumi Sakakibara, Ning Wang, Hsu-Chun Yen, Takashi Yokomori, Gexiang Zhang, and Xingyi Zhang.

The Organizing Committee consisted of Linqiang Pan, Xiaolong Shi, Hongwei Wang, Gexiang Zhang, Yao Zhang, and Zheng Zhang.

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- [8] The P Systems Website: www.ppage.psystems.eu, with a mirror in China, at <http://bmc.hust.edu.cn/PSystem/ppage.psystems.eu/index.php/Home.html>.

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(August 2012)

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