

## Contents

<b>Keynotes</b> .....	1
Membrane Computing at Twelve Years <i>G. Păun</i> .....	3
The Brave New World of RNA <i>P. Stadler</i> .....	5
Testing Based on P Systems – An Overview <i>M. Gheorghe, F. Ipate</i> .....	7
<b>Invited Talks</b> .....	11
Mobility in Computer Science and in Membrane Systems <i>G. Ciobanu</i> .....	13
Organization Oriented Chemical Computing <i>P. Dittrich</i> .....	15
Cellular Automata and the Quest for Artificial Self-Reproducing Structures <i>M. Kutrib</i> .....	17
An Algorithmic Approach to Tilings of Hyperbolic Spaces: 10 Years Later <i>M. Margenstern</i> .....	19
<b>Full Papers</b> .....	23
Flattening the Transition P Systems with Dissolution <i>O. Agrigoroaiei, G. Ciobanu</i> .....	25
The Family of Languages Generated by Non-Cooperative Membrane Systems <i>A. Alhazov, C. Ciobotaru, Y. Rogozhin, S. Ivanov</i> .....	37
Polymorphic P Systems <i>A. Alhazov, S. Ivanov, Y. Rogozhin</i> .....	53
A Small Universal Splicing P System <i>A. Alhazov, Y. Rogozhin, S. Verlan</i> .....	67
On the Expressive Power of Membrane Systems Working in Accepting Mode <i>R. Barbuti, A. Maggiolo-Schettini, P. Milazzo, S. Tini</i> .....	75
BioSimWare: A P Systems-based Simulation Environment for Biological Systems <i>D. Besozzi, P. Cazzaniga, G. Mauri, D. Pescini</i> .....	93
Modeling Population Growth of Pyrenean Chamois ( <i>Rupicapra p. pyrenaica</i> ) by using P Systems <i>M.A. Colomer, S. Lavin, I. Marco, A. Margalida, I. Perez-Hurtado, M.J. Perez-Jimenez, D. Sanuy, E. Serrano, L. Valencia-Cabrera</i> ...	121
On Generalized Communicating P Systems with One Symbol <i>E. Csuhaj-Varju, G. Vaszil, S. Verlan</i> .....	137

Design Pattern-Based Solutions for General Membrane System Components	
<i>I. Dincă</i> .....	155
A Faster P Solution for the Byzantine Agreement Problem	
<i>M.J. Dinneen, Y.B. Kim, R. Nicolescu</i> .....	167
Computationally Complete Spiking Neural P Systems without Delay: Two Types of Neurons Are Enough	
<i>R. Freund, M. Kogler</i> .....	193
P Systems and Unique-sum Sets	
<i>P. Frisco</i> .....	205
An Integrated Approach to P Systems Formal Verification	
<i>M. Gheorghe, F. Ipate, R. Lefticaru, C. Dragomir</i> .....	225
Using the SRSim Software for Spatial and Rule-based Modeling of Combinatorially Complex Biochemical Reaction Systems	
<i>G. Grünert, P. Dittrich</i> .....	239
Depth-first Search with P Systems	
<i>M.A. Gutierrez-Naranjo, M.J. Perez-Jimenez</i> .....	257
Towards Modelling of Reactive, Goal-oriented and Hybrid Intelligent Agents using P Systems	
<i>P. Kefalas, I. Stamatopoulou</i> .....	269
Goldbeter's Mitotic Oscillator Entirely Modeled by MP Systems	
<i>V. Manca, L. Marchetti</i> .....	277
Some Characteristics of Spiking Neural P Systems with Anti-spikes	
<i>V.P. Metta, K. Krithivasan, D. Garg</i> .....	291
Modelling Spatial Heterogeneity and Macromolecular Crowding with Membrane Systems	
<i>E. Mosca, P. Cazzaniga, D. Pescini, G. Mauri, L. Milanesi</i> .....	305
A Universal Spiking Neural P System with 11 Neurons	
<i>T. Neary</i> .....	327
Randomized Gandy-Păun-Rozenberg Machines	
<i>A. Obtulowicz</i> .....	347
Feasibility of Organizations – A Refinement of Chemical Organization Theory with Application to P Systems	
<i>S. Peter, T. Veloz, P. Dittrich</i> .....	369
P Systems with Elementary Active Membranes: Beyond NP and coNP	
<i>A.E. Porreca, A. Leporati, G. Mauri, C. Zandron</i> .....	383
Polynomial Complexity Classes in Spiking Neural P Systems	
<i>P. Sosik, A. Rodriguez-Paton, L. Ciencialova</i> .....	393
Spiking Neural P Systems with Neuron Division	
<i>J. Wang, H.J. Hoogeboom, L. Pan</i> .....	407
Matrix Representation of Spiking Neural P Systems	
<i>X. Zeng, H. Adorna, M.A. Martinez-del-Amor, L. Pan, M.J. Perez-Jimenez</i> .....	425

<b>Extended Abstracts</b> .....	441
Model of Surface Water Quality <i>V. Antohe, C. Stanciu</i> .....	443
On PCol Automata Working in the t-Mode <i>L. Cienciala, L. Ciencialova</i> .....	447
Tools for P System Testing <i>A. Ciobanu, R. Lefticaru, I.M. Niculescu, F. Ipat</i> .....	451
Massive Data-parallel Swarm Simulation and Visualisation using CUDA <i>P. Lucas</i> .....	455
Conway's Game of Life Accelerated with OpenCL <i>T. Rumpf</i> .....	459
String-object Transduction with Dogmatic P Systems <i>J.M. Sempere</i> .....	463
<b>List of Authors</b> .....	467