

S. Bandini and G. Mauri (Eds)

---

# ACRI '96

**Proceedings of the Second Conference on Cellular  
Automata for Research and Industry,  
Milan, Italy, 16-18 October 1996**

With 79 figures



Springer

# Contents

## Invited Lectures

Programming Environments for Cellular Automata <i>T. Worsch</i> .....	3
A Lattice Boltzmann Wave Model and its Applications <i>B. Chopard, P.O. Luthi</i> .....	13
Complex Systems and Core Competencies for the Industrial Innovation <i>F. Forlani</i> .....	25

## Contributed Papers

Coupled Maps Lattice Dynamics on a Variable Space for the Study of Development <i>F.A. Bignone</i> .....	31
Essential Transformations of the One Dimensional Cellular Automata Rule Space and Endomorphisms of Compact Abelian Groups <i>G. Cattaneo, E. Formenti, G. Mauri, A. Vaccaro, L. Margara</i> .....	42
Lyapunov Exponents Vs Expansivity and Sensitivity in Cellular Automata <i>M. Finelli, G. Manzini, L. Margara</i> .....	57
Quasiperiod-3 and Period 3 Collective Behavior in Three Dimensional Totalistic Illegal Cellular Automata with High Connectivity <i>F. Jiménez-Morales, H. Karma, J.J. Luque, M.C. Lemos</i> .....	72
Simulation of Water Flow through a Porous Soil by Cellular Automaton Model <i>S. Di Gregorio, R. Rongo, R. Serra, W. Spataro, M. Villani</i> .....	79
Solving Routing Problems with Cellular Automata <i>C. Hochberger, R. Hoffmann</i> .....	89
Towards Multilayered Automata Networks <i>S. Bandini, G. Mauri</i> .....	99
A Composite Automaton Designed to Model Complex Biological Systems. Modeling the Calcium-Ion Distribution in the Living Cell <i>S. Bandini, R. Fesce, G. Malagutti</i> .....	106
Time Dependant Grid Simulation by a Cellular Automata Network <i>D. Castagnolo, M.M. Furnari, F. Mele, R. Napolitano</i> .....	117

<b>Cellular Neural Networks for Realizing Associative Memories</b> <i>E. Pessa, C. Palma, M.P. Penna</i> .....	127
<b>A Cellular Automata Approach to the Simulation of a Prey-Predator System of Mites</b> <i>S. Bandini, R. Casati</i> .....	135
<b>Urban Cellular Automata: an Evolutionary Prototype</b> <i>L. Papini, G.A. Rabino</i> .....	147
<b>A Cooperative Edge Grammar for Edge Detection</b> <i>G. Adorni, V. D'Andrea, R.A. Marques Pereira</i> .....	158
<b>Hardware Supported Simulation Systems for Graph Based and 3-D Cellular Processing</b> <i>P. Hartmann, C. Hochberger, R. Hoffmann, R. Schneider, K.-P. Völkman</i> ....	168
<b>Evolvable Cellular Machines</b> <i>M. Sipper, M. Tomassini</i> .....	177
<b>A High-Level Language for Programming Cellular Algorithms on Parallel Machines</b> <i>G. Spezzano, D. Talia</i> .....	187
<b>Author Index</b> .....	197