

Table of Contents

Artificial Chemistries, Pre-biotic Evolution

Chemical Organizations at Different Spatial Scales	1
<i>Pietro Speroni di Fenizio and Peter Dittrich</i>	
Formulating Membrane Dynamics with the Reaction of Surface Objects . .	12
<i>Kazuto Tominaga, Tooru Watanabe, and Maki Suzuki</i>	
Multi-level Selectional Stalemate in a Simple Artificial Chemistry	22
<i>Barry McMullin, Ciarán Kelly, and Darragh O'Brien</i>	
Simulation Model for Functionalized Vesicles: Lipid-Peptide Integration in Minimal Protocells	32
<i>Kepa Ruiz-Mirazo and Fabio Mavelli</i>	

Evolution

Emergence of Genetic Coding: An Information-Theoretic Model	42
<i>Mahendra Piraveenan, Daniel Polani, and Mikhail Prokopenko</i>	
Emergent Phenomena Only Belong to Biology	53
<i>Hugues Bersini and Christophe Philemotte</i>	
Genotype Editing and the Evolution of Regulation and Memory	63
<i>Luis M. Rocha and Jasleen Kaur</i>	
Investigating the Emergence of Phenotypic Plasticity in Evolving Digital Organisms	74
<i>Jeff Clune, Charles Ofria, and Robert T. Pennock</i>	
Simulation of the Evolution of Aging: Effects of Aggression and Kin-Recognition	84
<i>Svetlana Krivenko and Mikhail Burtsev</i>	

Ecosystems

Artificial Ecosystem Selection for Evolutionary Optimisation	93
<i>Hywel T.P. Williams and Timothy M. Lenton</i>	
Building Virtual Ecosystems from Artificial Chemistry	103
<i>Alan Dorin and Kevin B. Korb</i>	

Energy Flows and Maximum Power on an Evolutionary Ecological Network Model	113
<i>Jiang Zhang</i>	
Entropy Production in Ecosystems	123
<i>Nathaniel Virgo and Inman Harvey</i>	
Increasing Complexity Can Increase Stability in a Self-regulating Ecosystem	133
<i>James Dyke, Jamie McDonald-Gibson, Ezequiel Di Paolo, and Inman Harvey</i>	
Niche Differentiation and Coexistence in a Multi-resource Ecosystem with Competition	143
<i>Walter de Back, László Gulyás, and George Kampis</i>	
Variance in Water Temperature as a Factor in the Modelling of Starfish and Mussel Population Density and Diversity	153
<i>David White</i>	
Morphodynamics, Development	
Cell Tracking: Genesis and Epigenesis in an Artificial Organism	163
<i>Alessandro Fontana</i>	
Developmental Neural Heterogeneity Through Coarse-Coding Regulation	172
<i>Jekanthan Thangavelautham and Gabriele M.T. D’Eleuterio</i>	
Re-examination of Swimming Motion of Virtually Evolved Creature Based on Fluid Dynamics	183
<i>Yoshiyuki Usami</i>	
Adaptive Behavior	
Adaptation to Sensory Delays	193
<i>Marieke Rohde and Ezequiel Di Paolo</i>	
Adapting to Your Body	203
<i>Peter Fine, Ezequiel Di Paolo, and Eduardo Izquierdo</i>	
An Analysis of Behavioral Attractor Dynamics	213
<i>Alberto Montebelli, Carlos Herrera, and Tom Ziemke</i>	
Artificial Emotions: Are We Ready for Them?	223
<i>Jackeline Spinola de Freitas and João Queiroz</i>	
Evolution of an Adaptive Sleep Response in Digital Organisms	233
<i>Benjamin E. Beckmann, Philip K. McKinley, and Charles Ofria</i>	

Where Did I Put My Glasses? Determining Trustfulness of Records in Episodic Memory by Means of an Associative Network	243
<i>Cyril Brom, Klára Pešková, and Jiří Lukavský</i>	

Grounding Action-Selection in Event-Based Anticipation	253
<i>Philippe Capdepuuy, Daniel Polani, and Chrystopher L. Nehaniv</i>	

Learning and Evolution

Aging in Artificial Learning Systems	263
<i>Sarunas Raudys</i>	

An Analysis of the Effects of Lifetime Learning on Population Fitness and Diversity in an NK Fitness Landscape	273
<i>Dara Curran, Colm O’Riordan, and Humphrey Sorensen</i>	

Embodied Evolution and Learning: The Neglected Timing of Maturation .	284
<i>Steffen Wischmann, Kristin Stamm, and Florentin Wörgötter</i>	

Evolution and Learning in an Intrinsically Motivated Reinforcement Learning Robot	294
<i>Massimiliano Schembri, Marco Mirolli, and Gianluca Baldassarre</i>	

Evolving Cultural Learning Parameters in an NK Fitness Landscape	304
<i>Dara Curran, Colm O’Riordan, and Humphrey Sorensen</i>	

How Does Niche Construction Reverse the Baldwin Effect?	315
<i>Hajime Yamauchi</i>	

Improving Search Efficiency in the Action Space of an Instance-Based Reinforcement Learning Technique for Multi-robot Systems	325
<i>Toshiyuki Yasuda and Kazuhiro Ohkura</i>	

Improving Agent Localisation Through Stereotypical Motion	335
<i>Bart Baddeley and Andrew Philippides</i>	

Neuroevolution of Agents Capable of Reactive and Deliberative Behaviours in Novel and Dynamic Environments	345
<i>Edward Robinson, Timothy Ellis, and Alastair Channon</i>	

On the Adaptive Disadvantage of Lamarckianism in Rapidly Changing Environments	355
<i>Ingo Paenke, Bernhard Sendhoff, Jon Rowe, and Chrisantha Fernando</i>	

The Dynamics of Associative Learning in an Evolved Situated Agent	365
<i>Eduardo Izquierdo and Inman Harvey</i>	

Communication, Constitution of Meaning, Language

Constructing the Basic *Umwelt* of Artificial Agents: An Information-Theoretic Approach 375
Philippe Capdepuy, Daniel Polani, and Chrystopher L. Nehaniv

Directed Evolution of Communication and Cooperation in Digital Organisms 384
David B. Knoester, Philip K. McKinley, Benjamin Beckmann, and Charles Ofria

Evolution of Acoustic Communication Between Two Cooperating Robots. 395
Elio Tuci and Christos Ampatzis

Group Size Effects on the Emergence of Compositional Structures in Language 405
Paul Vogt

Language Learning Dynamics: Coexistence and Selection of Grammars .. 415
Valery Tereshko

Multi-level Selection in the Emergence of Language Systematicity 425
Luc Steels, Remi van Trijp, and Pieter Wellens

Protolanguages That Are Semi-holophrastic 435
Mike Dowman

From the Outside-In: Embodied Attention in Toddlers 445
Linda B. Smith, Chen Yu, and Alfredo Pereira

Agency, Autopoiesis, Autonomy

Autonomy: A Review and a Reappraisal 455
Tom Froese, Nathaniel Virgo, and Eduardo Izquierdo

Category Theoretical Distinction Between Autopoiesis and (M,R) Systems 465
Tatsuya Nomura

Measuring Autonomy by Multivariate Autoregressive Modelling 475
Anil K. Seth

Minimal Agency Detection of Embodied Agents..... 485
Hiroyuki Iizuka and Ezequiel Di Paolo

Alife and Art

Hermeneutic Resonance in Animats and Art 495
Alasdair Turner

Robotic Superstrings Installation: A-Life Science & Art	505
<i>Mauro Francaviglia, Marcella Giulia Lorenzi, and Michael Petry</i>	

Dynamics of Social Systems, Collective Behavior

A Distributed Formation Algorithm to Organize Agents with No Coordinate Agreement	515
<i>Gregory Studer and Inman Harvey</i>	
A Multi-level Selection Model for the Emergence of Social Norms	525
<i>Francisco C. Santos, Fabio A.C.C. Chalub, and Jorge M. Pacheco</i>	
Evolution of Cooperation in a Population of Selfish Adaptive Agents	535
<i>Jorge M. Pacheco, Tom Lenaerts, and Francisco C. Santos</i>	
Evolutionary Dilemmas in a Social Network	545
<i>Leslie Luthi, Enea Pestelacci, and Marco Tomassini</i>	
Exogenous Fault Detection in a Collective Robotic Task	555
<i>Anders Lyhne Christensen, Rehan O'Grady, Mauro Birattari, and Marco Dorigo</i>	
From Artificial Societies to New Social Science Theory	565
<i>Eric Silverman and John Bryden</i>	
From Solitary to Collective Behaviours: Decision Making and Cooperation	575
<i>Vito Trianni, Christos Ampatzis, Anders Lyhne Christensen, Elio Tuci, Marco Dorigo, and Stefano Nolfi</i>	
Individual Selection for Cooperative Group Formation	585
<i>Simon T. Powers, Alexandra S. Penn and Richard A. Watson</i>	
Institutional Robotics	595
<i>Porfírio Silva and Pedro U. Lima</i>	
Investigating the Evolution of Cooperative Behaviour in a Minimally Spatial Model	605
<i>Simon T. Powers and Richard A. Watson</i>	
Modeling Decentralized Organizational Change in Honeybee Societies . . .	615
<i>Mark Hoogendoorn, Martijn C. Schut and Jan Treur</i>	
Social Facilitation on the Development of Foraging Behaviors in a Population of Autonomous Robots	625
<i>Alberto Acerbi, Davide Marocco and Stefano Nolfi</i>	
Social Impact Theory Based Optimizer	635
<i>Martin Macaš and Lenka Lhotská</i>	

The Role of Collective Reproduction in Evolution 645
John Bryden

Fear and the Behaviour of Virtual Flocking Animals 655
Carlos Delgado-Mata and Ruth S. Aylett

Swarm and Ant Colony Systems

Comparing ACO Algorithms for Solving the Bi-criteria Military Path-Finding Problem 665
Antonio M. Mora, Juan J. Merelo, Cristian Millán, Juan Torrecillas, Juan L.J. Laredo, and Pedro A. Castillo

Decentralized Control and Interactive Design Methods for Large-Scale Heterogeneous Self-organizing Swarms 675
Hiroki Sayama

EcoPS - a Model of Group-Foraging with Particle Swarm Systems 685
Cecilia Di Chio and Paolo Di Chio

Efficient Multi-foraging in Swarm Robotics 696
Alexandre Campo and Marco Dorigo

Modelling the Effects of Colony Age on the Foraging Behaviour of Harvester Ants 706
Tom Diethel and Peter Bentley

Robotics and Autonomous Agents: Concepts and Applications

A Mechanism to Self-assemble Patterns with Autonomous Robots 716
Anders Lyhne Christensen, Rehan O'Grady, and Marco Dorigo

Binocular Vision-Based Robot Control with Active Hand-Eye Coordination 726
Wen-Chung Chang

Controlling an Anthropomorphic Robot: A Preliminary Investigation 736
Hugo Gravato Marques, Richard Newcombe, and Owen Holland

Evolution of Neural Networks for Active Control of Tethered Airfoils 746
Allister Furey, and Inman Harvey

Feathered Flyer: Integrating Morphological Computation and Sensory Reflexes into a Physically Simulated Flapping-Wing Robot for Robust Flight Manoeuvre 756
YoonSik Shim and Phil Husbands

Guided Self-organisation for Autonomous Robot Development	766
<i>Georg Martius, J. Michael Herrmann, and Ralf Der</i>	
Near-Optimal Mobile Robot Recharging with the Rate-Maximizing Forager	776
<i>Jens Wawerla and Richard T. Vaughan</i>	
Neural Uncertainty and Sensorimotor Robustness	786
<i>Jose A. Fernandez-Leon and Ezequiel A. Di Paolo</i>	
Simulations of Simulations in Evolutionary Robotics	796
<i>Edgar Bermudez Contreras and Anil K. Seth</i>	
Synthesizing Physically-Realistic Environmental Models from Robot Exploration	806
<i>Josh Bongard</i>	
The Evolution of Pain	816
<i>Alberto Acerbi and Domenico Parisi</i>	

Evolutionary Computation

A Computational Morphogenesis Approach to Simple Structure Development	825
<i>Enrique Fernández-Blanco, Julián Dorado, Juan R. Rabuñal, Marcos Gestal, and Nieves Pedreira</i>	
Program Evolvability Under Environmental Variations and Neutrality . . .	835
<i>Tina Yu</i>	
The Creativity Potential Within Evolutionary Algorithms	845
<i>David Iclănzan</i>	
The Problems with Counting Ancestors in a Simple Genetic Algorithm . .	855
<i>Robert Collier and Mark Wineberg</i>	

Networks, Cellular Automata, Complex Systems

Asynchronous Graph-Rewriting Automata and Simulation of Synchronous Execution	865
<i>Kohji Tomita, Satoshi Murata, and Haruhisa Kurokawa</i>	
Catalysis by Self-assembled Structures in Emergent Reaction Networks . .	876
<i>Gianluca Gazzola, Andrew Buchanan, Norman Packard, and Mark Bedau</i>	

Community Detection in Complex Networks Using Collaborative Evolutionary Algorithms	886
<i>Anca Gog, D. Dumitrescu, and Béat Hirsbrunner</i>	
Detecting Non-trivial Computation in Complex Dynamics	895
<i>Joseph T. Lizier, Mikhail Prokopenko, and Albert Y. Zomaya</i>	
Evolution of One-Dimensional Cellular Automata by $1/f$ Noise	905
<i>Shigeru Ninagawa</i>	
Genotype Reuse More Important than Genotype Size in Evolvability of Embodied Neural Networks	915
<i>Chad W. Seys and Randall D. Beer</i>	
Information-Cloning of Scale-Free Networks	925
<i>Mahendra Piraveenan, Mikhail Prokopenko, and Albert Y. Zomaya</i>	
MBEANN: Mutation-Based Evolving Artificial Neural Networks	936
<i>Kazuhiro Ohkura, Toshiyuki Yasuda, Yuichi Kawamatsu, Yoshiyuki Matsumura, and Kanji Ueda</i>	
Measuring Entropy in Embodied Neural Agents with Homeostatic Units: A Link Between Complexity and Cybernetics	946
<i>Jorge Simão</i>	
Networks Regulating Networks: The Effects of Constraints on Topological Evolution	956
<i>Francisco C. Santos, Hugues Bersini, and Tom Lenaerts</i>	
Preliminary Investigations on the Evolvability of a Non-spatial GasNet Model	966
<i>Patricia A. Vargas, Ezequiel A. Di Paolo, and Phil Husbands</i>	
Semi-synchronous Activation in Scale-Free Boolean Networks	976
<i>Christian Darabos, Mario Giacobini, and Marco Tomassini</i>	
Spatial Embedding and Complexity: The Small-World Is Not Enough . . .	986
<i>Christopher L. Buckley and Seth Bullock</i>	
The Application of the Idea of Extended Cellular Automata for Some Pedestrian Behaviors	996
<i>Eva Dudek-Dyduch, Jarosław Wąs, and Bartłomiej Gudowski</i>	
Transients of Active Tracking: A Stroll in Attractor Spaces	1006
<i>Mario Negrello and Frank Pasemann</i>	
Wavelet Network with Hybrid Algorithm to Linearize High Power Amplifiers	1016
<i>Nibaldo Rodriguez and Claudio Cubillos</i>	

Models and Methodologies

A Behavior-Based Model of the Hydra, Phylum Cnidaria	1024
<i>Malin Aktius, Mats Nordahl, and Tom Ziemke</i>	
A Computational System for Investigating Chemotaxis-Based Cell Aggregation	1034
<i>Manolya Eyiğurekli, Peter I. Lelkes, and David E. Breen</i>	
A Signal Based Approach to Artificial Agent Modeling	1050
<i>Luís Morgado and Graça Gaspar</i>	
Construction of Hypercycles in Typogenetics with Evolutionary Algorithms	1060
<i>Chohwa Gwak and Kyubum Wee</i>	
Designing a Methodology to Estimate Complexity of Protein Structures .	1069
<i>Alejandro Balbín and Eugenio Andrade</i>	
Designing for Surprise	1079
<i>Telmo Menezes and Ernesto Costa</i>	
Evolving Virtual Neuronal Morphologies: A Case Study in Genetic L-Systems Programming	1089
<i>Benjamin Torben-Nielsen</i>	
Folding Protein-Like Structures with Open L-Systems	1100
<i>Gemma B. Danks, Susan Stepney, and Leo S.D. Caves</i>	
Formal Model of Embodiment on Abstract Systems: From Hierarchy to Heterarchy	1110
<i>Kohei Nakajima, Soya Shinkai, and Takashi Ikegami</i>	
Neuro-evolution Methods for Designing Emergent Specialization	1120
<i>Geoff S. Nitschke</i>	
Neutral Emergence and Coarse Graining	1131
<i>Andrew Weeks, Susan Stepney, and Fiona Polack</i>	
New Models for Old Questions: Evolutionary Robotics and the 'A Not B' Error	1141
<i>Rachel Wood and Ezequiel Di Paolo</i>	
PLAZZMID: An Evolutionary Agent-Based Architecture Inspired by Bacteria and Bees	1151
<i>Susan Stepney, Tim Clarke, and Peter Young</i>	
Self-organizing Acoustic Categories in Sensor Arrays	1161
<i>Ivan Escobar, Erika Vilches, Edgar E. Vallejo, Martin L. Cody, and Charles E. Taylor</i>	

Self-organizing Systems Based on Bio-inspired Properties	1171
<i>André Stauffer, Daniel Mange, and Joël Rossier</i>	
Stepwise Transition from Direct Encoding to Artificial Ontogeny in Neuroevolution	1182
<i>Benjamin Inden</i>	
Symbiosis, Synergy and Modularity: Introducing the Reciprocal Synergy Symbiosis Algorithm	1192
<i>Rob Mills and Richard A. Watson</i>	
Turing Complete Catalytic Particle Computers	1202
<i>Anthony M.L. Liekens and Chrisantha T. Fernando</i>	
Author Index	1213



<http://www.springer.com/978-3-540-74912-7>

Advances in Artificial Life

9th European Conference, ECAL 2007, Lisbon, Portugal,

September 10-14, 2007, Proceedings

Almeida e Costa, F. (Ed.)

2007, XVIII, 1218 p. In 2 volumes, not available

separately., Softcover

ISBN: 978-3-540-74912-7