

# Contents

<b>1</b>	<b>Nonuniversality in Computation: Fifteen Misconceptions Rectified</b> . . . . .	<b>1</b>
	Selim G. Akl	
<b>2</b>	<b>What Is Computable? What Is Feasibly Computable? A Physicist's Viewpoint</b> . . . . .	<b>31</b>
	Vladik Kreinovich and Olga Kosheleva	
<b>3</b>	<b>The Ideal Energy of Classical Lattice Dynamics</b> . . . . .	<b>59</b>
	Norman Margolus	
<b>4</b>	<b>An Analogue-Digital Model of Computation: Turing Machines with Physical Oracles</b> . . . . .	<b>73</b>
	Tânia Ambaram, Edwin Beggs, José Félix Costa, Diogo Poças and John V. Tucker	
<b>5</b>	<b>Physical and Formal Aspects of Computation: Exploiting Physics for Computation and Exploiting Computation for Physical Purposes</b> . . . . .	<b>117</b>
	Bruce J. MacLennan	
<b>6</b>	<b>Computing in Perfect Euclidean Frameworks</b> . . . . .	<b>141</b>
	Jérôme Durand-Lose	
<b>7</b>	<b>Unconventional Computers and Unconventional Complexity Measures</b> . . . . .	<b>165</b>
	Ed Blakey	
<b>8</b>	<b>Decreasing Complexity in Inductive Computations</b> . . . . .	<b>183</b>
	Mark Burgin	
<b>9</b>	<b>Asymptotic Intrinsic Universality and Natural Reprogrammability by Behavioural Emulation</b> . . . . .	<b>205</b>
	Hector Zenil and Jürgen Riedel	

<b>10</b>	<b>Two Small Universal Reversible Turing Machines . . . . .</b>	<b>221</b>
	Kenichi Morita	
<b>11</b>	<b>Percolation Transition and Related Phenomena in Terms of Grossone Infinity Computations . . . . .</b>	<b>239</b>
	Dmitry I. Iudin and Yaroslav D. Sergeyev	
<b>12</b>	<b>Spacetime Computing: Towards Algorithmic Causal Sets with Special-Relativistic Properties . . . . .</b>	<b>267</b>
	Tommaso Bolognesi	
<b>13</b>	<b>Interaction-Based Programming in MGS . . . . .</b>	<b>305</b>
	Antoine Spicher and Jean-Louis Giavitto	
<b>14</b>	<b>Cellular Automata in Hyperbolic Spaces . . . . .</b>	<b>343</b>
	Maurice Margenstern	
<b>15</b>	<b>A Computation in a Cellular Automaton Collider Rule 110 . . . . .</b>	<b>391</b>
	Genaro J. Martínez, Andrew Adamatzky and Harold V. McIntosh	
<b>16</b>	<b>Quantum Queries Associated with Equi-partitioning of States and Multipartite Relational Encoding Across Space-Time . . . . .</b>	<b>429</b>
	Karl Svozil	
<b>17</b>	<b>Solving the Broadcast Time Problem Using a D-wave Quantum Computer. . . . .</b>	<b>439</b>
	Cristian S. Calude and Michael J. Dinneen	
<b>18</b>	<b>The Group Zoo of Classical Reversible Computing and Quantum Computing. . . . .</b>	<b>455</b>
	Alexis De Vos and Stijn De Baerdemacker	
<b>19</b>	<b>Fault Models in Reversible and Quantum Circuits . . . . .</b>	<b>475</b>
	Martin Lukac, Michitaka Kameyama, Marek Perkowski, Pawel Kerntopf and Claudio Moraga	
<b>20</b>	<b>A Class of Non-optimum-time FSSP Algorithms . . . . .</b>	<b>495</b>
	Hiroshi Umeo	
<b>21</b>	<b>Universality of Asynchronous Circuits Composed of Locally Reversible Elements . . . . .</b>	<b>523</b>
	Jia Lee	
<b>22</b>	<b>Reservoir Computing as a Model for <i>In-Materio</i> Computing . . . . .</b>	<b>533</b>
	Matthew Dale, Julian F. Miller and Susan Stepney	
<b>23</b>	<b>On Reservoir Computing: From Mathematical Foundations to Unconventional Applications . . . . .</b>	<b>573</b>
	Zoran Konkoli	

<b>24</b>	<b>Computational Properties of Cell Regulatory Pathways Through Petri Nets . . . . .</b>	<b>609</b>
	Paolo Dini	
<b>25</b>	<b>Kernel P Systems and Stochastic P Systems for Modelling and Formal Verification of Genetic Logic Gates . . . . .</b>	<b>661</b>
	Marian Gheorghe, Savas Konur and Florentin Ipate	
<b>26</b>	<b>On Improving the Expressive Power of Chemical Computation . . . . .</b>	<b>677</b>
	Erik Bergh and Zoran Konkoli	
<b>27</b>	<b>Conventional and Unconventional Approaches to Swarm Logic . . . . .</b>	<b>711</b>
	Andrew Schumann	
<b>28</b>	<b>On the Inverse Pattern Recognition Problem in the Context of the Time-Series Data Processing with Memristor Networks . . . .</b>	<b>735</b>
	Christopher Bennett, Aldo Jesorka, Göran Wendin and Zoran Konkoli	
<b>29</b>	<b>Self-Awareness in Digital Systems: Augmenting Self-Modification with Introspection to Create Adaptive, Responsive Circuitry . . . .</b>	<b>759</b>
	Nicholas J. Macias and Lisa J.K. Durbeck	
<b>30</b>	<b>Looking for Computers in the Biological Cell. After Twenty Years . . . . .</b>	<b>805</b>
	Gheorghe Păun	
<b>31</b>	<b>Unconventional Computing: A Brief Subjective History . . . . .</b>	<b>855</b>
	Cristian S. Calude	
	<b>Index . . . . .</b>	<b>865</b>

Advances in Unconventional Computing

Volume 1: Theory

Adamatzky, A. (Ed.)

2017, IX, 874 p. 367 illus., 209 illus. in color., Hardcover

ISBN: 978-3-319-33923-8