

Unconventional Computing
2007

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Editors

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Luniver Press
2007

Published by Luniver Press
Frome BA11 6TT United Kingdom

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

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ISBN-10: 1-905986-05-X
ISBN-13: 978-1-905986-05-7

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Editorial

Unconventional computing is the quest for groundbreaking new algorithms and physical implementations of novel and ultimately — compared to classical approaches — more powerful computing paradigms and machines based on and inspired by principles of information processing in physical, chemical and biological systems.

The book offers a timely collection of papers presented at the 2007 Unconventional Computing 2007 conference which was held in Bristol, July 12-14, 2007. The event was financially supported by the Engineering and Physical Sciences Research Council (EPSRC), the UK Government's leading funding agency for research and training in engineering and the physical sciences.

The Unconventional Computing 2007 conference is a successor of several previous events: The Grand Challenges in Non-Classical Computation International Workshop (York, UK, 2005), the Workshop on Unconventional Computing at ECAL2005 (Kent, UK, 2005), the workshop From Utopian to Genuine Unconventional Computers at UC2006 (York, UK, 2006), and Unconventional Computation: Quo Vadis? conference (Santa Fe, USA, 2007).

The conference aims to bring together world-leading scientists whose research focuses on non-traditional theoretical machines, experimental prototypes and genuine implementations of non-classical computing devices, who try to revisit existing approaches in unconventional computing, provide scientists and engineers with blueprints of realisable computing devices, and take a critical glance at the design of novel and emergent computing systems to point out failures and shortcomings of both theoretical and experimental approaches.

This book includes cutting-edge theoretical work on quantum and kinematic Turing machines, computational complexity of physical systems, molecular and chemical computation, processing incomplete information, physical hypercomputation, automata networks and swarms. They are complemented by recent results on experimental implementations of logical and arithmetical circuits in a domino substrate, DNA computers, and self-assembly.

We hope the book will encourage interdisciplinary interactions in the field of emergent computing paradigms and architectures; develop a common interface between computer science, biology, mathematics, chemistry, electronics engineering, and physics; create new research communities in non-classical computation; and promote the transfer of knowledge between different research communities.

Andrew Adamatzky, Larry Bull, Benjamin De Lacy Costello,
Susan Stepney, Christof Teuscher,
The Conference Organizers
Bristol (UK), York (UK), Los Alamos (USA)
May 2007

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