Computational science, an emerging and increasingly vital field, is now widely recognized as an integral part of scientific and technical investigations, affecting researchers and practitioners in areas ranging from aerospace and automotive research to biochemistry, electronics, geosciences, mathematics, and physics. Computer systems research and the exploitation of applied research naturally complement each other. The increased complexity of many challenges in computational science demands the use of supercomputing, parallel processing, sophisticated algorithms, and advanced system software and architecture. It is therefore invaluable to have input by systems research experts in applied computational science research.

Transactions on Computational Science focuses on original high-quality research in the realm of computational science in parallel and distributed environments, also encompassing the underlying theoretical foundations and the applications of large-scale computation. The journal offers practitioners and researchers the opportunity to share computational techniques and solutions in this area, to identify new issues, and to shape future directions for research, and it enables industrial users to apply leading-edge, large-scale, high-performance computational methods.

In addition to addressing various research and application issues, the journal aims to present material that is validated – crucial to the application and advancement of the research conducted in academic and industrial settings. In this spirit, the journal focuses on publications that present results and computational techniques that are verifiable.

Scope

The scope of the journal includes, but is not limited to, the following computational methods and applications:

- Aeronautics and Aerospace
- Astrophysics
- Bioinformatics
- Climate and Weather Modeling
- Communication and Data Networks
- Compilers and Operating Systems
- Computer Graphics
- Computational Biology
- Computational Chemistry
- Computational Finance and Econometrics
- Computational Fluid Dynamics
- Computational Geometry
- Computational Number Theory
- Computational Physics
- Data Storage
- Data Mining and Data Warehousing
- Geology and Geophysics
- Grid Computing
- Hardware/Software Co-design
- High-Energy Physics
- High-Performance Computing
- Information Retrieval
- Modeling and Simulations
- Numerical and Scientific Computing
- Parallel and Distributed Computing
- Reconfigurable Hardware
- Supercomputing
- System-on-Chip Design and Engineering
- Virtual Reality
- Visualization
The Transactions on Computational Science journal is part of the Springer series *Lecture Notes in Computer Science*, and is devoted to the gamut of computational science issues, from theoretical aspects to application-dependent studies and the validation of emerging technologies.

The journal focuses on original high-quality research in the realm of computational science in parallel and distributed environments, encompassing the facilitating theoretical foundations and the applications of large-scale computations and massive data processing. Practitioners and researchers share computational techniques and solutions in the area, identify new issues, and shape future directions for research, as well as enable industrial users to apply the techniques presented.

The current issue consists of two parts: Part I is devoted to robotics and cognitive computing, and Part II to wireless sensor networks security. Part I is comprised of four papers, spanning the areas of robotics and augmented reality, computer game evaluation strategy, cognitive perception in crowd control simulation, and reversible processor design using look-ahead. Part II is comprised of five papers linked closely to the area of security in sensor networks. These papers cover the topics of secure congestion adaptive routing, cryptographic schemes for wireless sensor networks, intersection attacks on anonymity, and reliable message delivery in Vehicular Ad Hoc Networks (VANET), and present new authenticated key agreement protocols.

We would like to extend our sincere appreciation to the TCS Editorial Board and external reviewers for their dedication and insights in preparing this issue. We would also like to thank all of the authors for submitting their papers to the issue. We would like to express our gratitude to the LNCS editorial staff of Springer, in particular Alfred Hofmann, Ursula Barth and Anna Kramer, who supported us at every stage of the project.

It is our hope that the fine collection of papers presented in this issue will be a valuable resource for Transactions on Computational Science readers and will stimulate further research into the vibrant area of computational science applications.

October 2012

Marina L. Gavrilova
C.J. Kenneth Tan
Marina L. Gavrilova, Editor-in-chief
University of Calgary, Canada
Chih Jeng Kenneth Tan, Editor-in-chief
OptimaNumerics, UK
Tetsuo Asano
JAIST, Japan
Brian A. Barsky
University of California at Berkeley, USA
Alexander V. Bogdanov
Institute for High Performance Computing and Data Bases, Russia

Martin Buecker
Aachen University, Germany
Rajkumar Buyya
University of Melbourne, Australia
Hyungseong Choo
Sungkyunkwan University, Korea
Danny Crookes
Queen’s University Belfast, UK
Tamal Dey
Ohio State University, USA
Ivan Dimov
Bulgarian Academy of Sciences, Bulgaria
Magdy El-Tawil
Cairo University, Egypt
Osvaldo Gervasi
Università degli Studi di Perugia, Italy
Christopher Gold
University of Glamorgan, UK
Rodolfo Haber
Council for Scientific Research, Spain
Andres Iglesias
University of Cantabria, Spain
Deok-Soo Kim
Hanyang University, Korea
Ivana Kolingerova
University of West Bohemia, Czech Republic
Vipin Kumar
Army High Performance Computing Research Center, USA
Antonio Lagana
Università degli Studi di Perugia, Italy
D.T. Lee
Institute of Information Science, Academia Sinica, Taiwan
Laurence Liew
Platform Computing, Singapore
Nikolai Medvedev
Novosibirsk Russian Academy of Sciences, Russia
Graham M. Megson
University of Reading, UK
Edward D. Moreno
UEA – University of Amazonas state, Brazil
Youngsong Mun
Soongsil University, Korea
Dimitri Plemenos
Université de Limoges, France
Viktor K. Prasanna
University of Southern California, USA
Muhammad Sarfraz
KFUPM, Saudi Arabia
Dale Shires
Army Research Lab, USA
Masha Sosonkina
Ames Laboratory, USA
Alexei Sourin
Nanyang Technological University, Singapore
David Taniar
Monash University, Australia
Athanasios Vasilakos
University of Western Macedonia, Greece
Chee Yap
New York University, USA
Igor Zacharov
SGI Europe, Switzerland
Zahari Zlatev
National Environmental Research Institute, Denmark
# Table of Contents

**Part I: Neural Networks and Cognitive Computing**

An Evaluation of Camera Pose Methods for an Augmented Reality System: Application to Teaching Industrial Robots ............... 3  
   *Madjid Maidi, Malik Mallem, Laredj Benchikh, and Samir Otmane*

A Combined Position Evaluation Function in Chinese Chess Computer Game .......................................................... 31  
   *Yulin He, Xizhao Wang, and Tingting Fu*

Modeling and Analyzing the Human Cognitive Limits for Perception in Crowd Simulation ............................................. 51  
   *Vaisagh Viswanathan and Michael Lees*

Progress in Reversible Processor Design: A Novel Methodology for Reversible Carry Look-Ahead Adder ............................ 73  
   *Himanshu Thapliyal, H.V. Jayashree, A.N. Nagamani, and Hamid R. Arabnia*

**Part II: Wireless Sensor Networks Security**

Secure Congestion Adaptive Routing Using Group Signature Scheme ... 101  
   *Laxmi Shrivastava, Sarita S. Bhadauria, Geetam Singh Tomar, and Brijesh Kumar Chaurasia*

Practicability of HFE Scheme for Wireless Sensor Network .......... 116  
   *Pradheepkumar Singaravelu and Shekhar Verma*

Intersection Attack on Anonymity in VANET  ......................... 133  
   *Brijesh Kumar Chaurasia, Shekhar Verma, and Geetam Singh Tomar*

Cluster Based RSU Centric Channel Access for VANETs ............. 150  
   *Ranjeet Singh Tomar, Shekhar Verma, and Geetam Singh Tomar*

Efficient Identity-Based and Authenticated Key Agreement Protocol.... 172  
   *Yongge Wang*

**Author Index** ........................................................................ 199