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Special Issue on Computer Graphics

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LNCS Transactions on Computational Science

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
- Big Data Analytics
- Bioinformatics
- Biometric Technologies
- 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
- Data Representation and Storage
- Data Mining and Data Warehousing
- Information and Online Security
- Grid Computing
- Hardware/Software Co-design
- High-Performance Computing
- Image and Video Processing
- Information Systems
- Information Retrieval
- Modeling and Simulations
- Mobile Computing
- Numerical and Scientific Computing
- Parallel and Distributed Computing
- Robotics and Navigation
- Supercomputing
- System-on-Chip Design and Engineering
- Virtual Reality and Cyberworlds
- Visualization

Editorial

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 presented techniques.

The current volume is devoted to the area of computer graphics. The volume is comprised of nine papers selected following the 36th installment of the Computer Graphics International Conference (CGI 2019), one of the oldest international annual conferences in computer graphics founded by the Computer Graphics Society (CGS). The conference was held in Calgary, Alberta, in June 2019 at the University of Calgary. This special issue is edited by CGI 2019 conference co-chairs: Prof. Jian Chang and Prof. Marina Gavrilova. All the accepted papers have been peer-reviewed.

We would like to extend our sincere appreciation to the special issue guest editors for their continuous dedication and insights in preparing this special issue. We would also like to thank all of the authors for submitting their papers to the journal and the associate editors and referees for their valuable work.

We do hope that the fine collection of papers presented in this special 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.

May 2020

Marina L. Gavrilova
C. J. Kenneth Tan

Guest Editor Preface

The Computer Graphics International (CGI) conference is one of the oldest international conferences on computer graphics in the world. It is the official conference of the Computer Graphics Society (CGS), a long-standing international computer graphics organization.

The 36th CGI conference was held in Calgary, Alberta, Canada, from June 17–20, 2019. It was organized by CGS, the University of Calgary, and the Alberta Innovates, and was in cooperation with ACM and EUROGRAPHICS. Various topics of computer graphics and related applications have been discussed at CGI 2019. Some of the top papers with extended and revised articles were invited to this issue of the *Transactions on Computational Science Journal*, Springer.

The paper "Do Distant or Colocated Audiences Affect User Activity in VR?" by Romain Terrier, Nicolas Martin, Jérémy Lacoche, Valérie Gouranton, and Bruno Arnaldi presents an experimental study on location and interactions with the audience through virtual reality.

The paper "Physical Environment Reconstruction Beyond Light Polarization for Coherent Augmented Reality Scene on Mobile Devices" by A'aeshah Alhakamy and Mihran Tuceryan provides geometric reconstruction for improved photo-realism of virtual objects in augmented reality.

The paper "Integrated Analysis and Hypothesis Testing for Complex Spatio-Temporal Data" by Kresimir Matkovic, Dieter W. Fellner, and Torsten Ullrich uses a deep learning method to analyze bird song features.

The paper "Action Sequencing in VR, a No-Code Approach" by Flavien Lécuyer, Valérie Gouranton, Adrien Reuzeau, Ronan Gaugne, and Bruno Arnaldi proposes to create scenarios in virtual reality without coding.

The paper "Single Color Sketch-Based Image Retrieval in HSV Color Space" by Yu Xia, Shuangbu Wang, Yanran Li, Lihua You, Xiaosong Yang, and Jian Jun Zhang introduces a fine-grained color sketch-based image retrieval method with deep leaning network.

The paper "Integral-Based Material Point Method and Peridynamics Model for Animating Elastoplastic Material" by Yao Lyu, Jinglu Zhang, Ari Sarafopoulos, Jian Chang, Shihui Guo, and Jian Jun Zhang develops a physically based approach for modeling deformation with peridynamics.

The paper "A Perceptually Coherent TMO for Visualization of 360° HDR Images on HMD" by Ific Goudé Rémi Cozot, and Olivier Le Meur suggests a tone mapping operator (TMO) to enhance visualization of 360° high-dynamic-range images on head mounted displays.

The paper "Simulating Crowds and Autonomous Vehicles" by John Charlton, Luis Montana Gonzalez, Steve Maddock, and Paul Richmond simulates large-scale scenes of crowds and vehicles with GPU acceleration.

The paper “MagiPlay: An Augmented Reality Serious Game Allowing Children to Program Intelligent Environments” by Evropi Stefanidi, Dimitrios Arampatzis, Asterios Leonidis, Maria Korozi, Margherita Antona, and George Papagiannakis defines an intelligent environment through a specially tailored user interface.

The organizers of the conference are very grateful to Prof. Marina Gavrilova, Editor in Chief of the *Transactions on Computational Science*, for her continuing support and assistance. We deeply thank the reviewers for their diligent work which helped improve the papers.

May 2020

Jian Chang
Nadia Magnenat Thalmann

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