

EDITORIAL

Special issue: 1st MICCAI workshop on Bio- Imaging and Visualization for Patient-Customized Simulations

Imaging and visualization are among the most dynamic and innovative areas of research of the past few decades. It has a lot of important practical applications such as the visualization of computational data, the processing of medical images for assisting medical diagnosis and intervention, and the 3D geometry reconstruction and processing for computer simulations.

Currently, due to the development of more powerful hardware, mathematical and physical methodologies, investigators have been incorporating advanced computational techniques to derive sophisticated methodologies that can better enable the solution of the problems encountered. Therefore many effective methodologies have been proposed, validated and some of them have already been integrated into commercial software for computer simulations.

The main goal of the workshop *Bio- Imaging and Visualization for Patient-Customized Simulations*, that was organized under the auspicious of the *16th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2013)*, held from 22 to 26 September 2013 in Nagoya, Japan, was to provide a platform for communications among specialists from complementary fields such as signal and image processing, mechanics, computational vision, mathematics, physics, informatics, computer graphics, bio-medical practice, psychology and industry. Participants in this workshop presented and discussed their techniques and methodologies; and together, they explored the translational potentials of these emerging technologies and associated technological fields. As such, an excellent forum was established between software developers, specialist researchers and applied end-users from diverse fields related to Signal Processing, Imaging, Visualization, Biomechanics and Simulation. The forum refined ideas for future work and to define constructive cooperation for new and improved solutions of imaging and visualization techniques, models and methodologies toward much more realistic and efficient computer simulations.


This special issue of the journal *Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization (CMBBE: Imaging & Visualization)*

contains the extended versions of five papers presented at the *MICCAI 2013 workshop Bio- Imaging and Visualization for Patient-Customized Simulations (MWBIVPCS 2013)*. These extended works were reviewed according to the *CMBBE: Imaging & Visualization* policy. They present and discuss new trends in those fields using several novel methods and techniques and addressing different applications: *Harandi et al.*, which won the *MWBIVPCS 2013 Best Paper Award*, propose a minimally interactive inter-subject mesh-to-image registration scheme to tackle 3D segmentation of the human tongue from MRI volumes based on shape matching and model-based registration; *Rechowicz et al.* pursue the minimization of risks for the minimally invasive technique for the repair of pectus excavatum, and propose a surgical simulator for Nuss procedure; *Linte et al.* present a platform to assessing pedicle screw fastening strength via a virtual templating platform for spine surgery planning; Wang et al. propose novel a colon wall flattening model for computed tomographic colonography; Li & Porikli present a biomechanical model-based four-dimensional computed tomography simulation method for examining the patient lung deformation induced by respiratory motion.

The Guest-Editors wish to thank all the *MWBIVPCS 2013* Authors and members of the Program Committee for sharing their expertise, *The MICCAI Society* for having hosted and supported the workshop within *MICCAI 2013* and also to the *CMBBE: Imaging & Visualization Editors and Reviewers* for helping improving the manuscripts accepted.

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