



## Editorial

## Special Section on Visual Computing in Biology and Medicine

This special issue is devoted to the topic of Visual Computing in Biology and Medicine and to our dear friend Dirk Bartz, who suddenly passed away in March 2010. Visual Computing in Biology and Medicine is the title of a Eurographics workshop series that we started in Delft in 2008. Dirk Bartz, as a pioneer in the field, was selected as organizer for the second workshop to be held in July 2010 in Leipzig, where Dirk was a Professor of Computer-Assisted Surgery. Although deeply saddened by his passing away, we decided to organize the workshop in his memory (Alexander Wiebel from Max-Planck-Institute of Leipzig greatly supported the organization). One of Dirk's last activities was to discuss with the Editor-in-Chief of this journal to provide a special issue on Visual Computing in Medicine, where the best workshop papers could be published in an extended and improved form. Dirk served as an associate editor of this journal for a long time and could convince the Editor-in-Chief that this was a good idea indeed. After Dirk passed away, we decided that we wanted to fulfill also this plan initiated by Dirk. The Editor-in-Chief J. Jorge agreed and offered to publish not only the three best VCBM conference papers but also other papers in that field. Thus, we are happy to present you a selection of seven papers on Visual Computing in Biology and Medicine. Based on the open call for contributions, twenty papers were submitted (among them the three invited papers, selected from the conference). Each of these papers was reviewed by at least three reviewers. As usual, a sufficient amount of new material was required, and the papers had to fit within the theme of the special issue while still being accessible to the usual Computers and Graphics readership. Thus, some papers – despite valuable content – had to be rejected since they were too specific to a focused application problem. Based on these reviews seven papers could be accepted with minor revision. The reviewers provided many constructive comments to improve the papers, leading to substantially enhanced contributions. After another round of minor improvement, the papers were finally accepted. The accepted papers span the following themes:

- *Interactive simulation*: Sermesant et al. [6] employ an electrophysiological model of the heart for the interactive simulation of RF ablation, while Wi et al. [7] present an interactive simulation of blood–coil interaction during aneurysm embolisation.
- *Network analysis*: Crippa et al. [2] present and demonstrate a method for the comparison of multi-channel EEG coherence networks. Oyarzun Laura et al. [4] extend the tree-matching algorithm of Graham et al. to support the interactive specification of constraints and of post-match modifications, and apply the new technique to the matching of liver vasculature.

- *Interactive segmentation*: Heckel et al. [3] present an interactive 3D segmentation technique that is based on energy minimizing, smooth and implicit functions.
- *Visual analysis*: Angelelli et al. [1] apply visual analysis to Contrast-Enhanced Ultrasound (CEUS) in cancer diagnosis.
- *Multi-variate visualization*: Ropinski et al. [5] review glyph-based visualization techniques for the visual representation of multi-variate medical data.

We are very happy with this selection of papers, both due to their high quality, and also due to the way in which they touch upon a number of important themes within the field of Visual Computing for Biology and Medicine.

## References

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- [3] Heckel F, Konrad O, Hahn HK, Peitgen H-O. Interactive 3D medical image segmentation with energy-minimizing implicit functions. *Computers and Graphics* 2011;35(2):275–87.
- [4] Oyarzun Laura C, Drechsler K. Computer assisted matching of anatomical vessel trees. *Computers and Graphics* 2011;35(2):299–311.
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- [6] Pernod E, Sermesant M, Konukoglu E, Relan J, Delingette H, Ayache N. A multi-front Eikonal, model of cardiac electrophysiology for interactive simulation of radio-frequency ablation. *Computers and Graphics* 2011;35(2):431–40.
- [7] Wei Y, Cotin S, Allard J, Fang L, Pan C, Ma S. Interactive blood–coil simulation in real-time during aneurysm embolization. *Computers and Graphics* 2011;35(2):422–30.



**Bernhard Preim** is a Professor for Visualization at Otto-von-Guericke-University of Magdeburg. He studied Computer Science at the same University and left with a Ph.D. in interactive Computer Graphics in 1999. He joined the staff of MEVIS (Center for Medical Diagnosis Systems and Visualization) Bremen where he earned a habilitation degree in 2002. His current research is focussed on medical visualization, in particular visual exploration of perfusion data, virtual endoscopy, and visualization of vascular structures. He gave many tutorials on medical visualization at Eurographics, EuroVis, IEEE Visualization and CARS and he is author of “Visualization in Medicine” (with

Dirk Bartz). Bernhard Preim serves as speaker of the German/Dutch group “Visual Computing in Medicine” and as first vice president of the German

Society for Computer-Assisted Surgery (CURAC). At the Innovation Center for Computer-Assisted Surgery (<http://www.iccas.de/>), he leads the scientific advisory board.



**Charl Botha** is a tenured assistant professor of Visualisation at the Delft University of Technology (TU Delft) in the Netherlands, where he heads medical visualisation research activities, currently with a group of four Ph.D. students. He also has an appointment at LKEB, the medical image processing section of the Department of Radiology at the Leiden University Medical Center (LUMC), in order to further stimulate the fruitful research collaboration between the technical university and the academic hospital. His research focuses on surgical planning and guidance, and visual analysis for medical research. He has co-authored papers on, among other topics, virtual colonoscopy, shoulder replacement, diffusion tensor imaging, and the visual analysis of human motion. He is one of the initiators of the Eurographics Workshop series

on Visual Computing for Biology and Medicine, and acted as co-chair in 2008 and 2010.

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