Guest Editor's Introduction: Special Section on EuroVis

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W E are very excited about the fact that extended versions of three outstanding papers from the Ninth Eurographics/IEEE VGTC Symposium on Visualization (EuroVis '07) have been invited to this special section of *IEEE Transactions on Visualization and Computer Graphics* (*TVCG*). EuroVis '07 took place in Norrköping, Sweden, from the 23rd to the 25th of May 2007 and it was in many ways a success. A record number of papers were submitted (93), of which 32 high quality full papers were selected by the committee based on nearly 500 reviews. A new attendance record of 125 participants was set. For the cochairs, it was a very challenging task to select among the many high quality papers the three papers to be presented in this special section. They are: 1) "Online Dynamic Graph Drawing," 2) "Animation of Orthogonal Texture Patterns for Vector Field Visualization," and 3) "Data-Driven Visualization and Group Analysis of Multichannel EEG Coherence with Functional Units."

The first paper by Yaniv Frishman and Ayellet Tal received the best paper award at the EuroVis '07 for its high relevance to the field of graph drawing. The paper presents a solution to the difficult problem of real-time update of graphs that are changing on-the-fly. The challenge is to update a graph-layout while still making it easy for the user to comprehend the changes. Dynamic layout has been one of the major open problems in graph drawing, and this paper takes a significant step beyond previous work. The speed is gained via a clever implementation exploiting modern graphics hardware.

The second paper by Sven Bachthaler and Daniel Weiskopf introduces animation of orthogonal vector field visualization on 2D manifolds. The authors generate a field that is orthogonal to the input vector field and use this field to create line patterns using line integral convolution. These line patterns are then animated to create the perception of the field motions. This novel idea is well founded in the perceptual aspects of animation in visualization and makes efficient use of the human capability of perceiving certain spatial frequencies in animations.

In the third paper, Michael ten Caat, Natasha M. Maurits, and Jos B.T.M. Roerdink attack the problem of visual clutter in data driven high density EEG coherence analysis. The authors approach the problem by identifying functional units, sets of connected electrodes, and representing them in a Voronoi diagram preserving the spatial relation between electrodes while decluttering the view. The coherence between the functional units can then be displayed in the context of the diagram. The method presented is a new data driven alternative to the normal hypothesis driven EEG coherence analysis and it is based on insight into the clinical problem at hand and development of novel visualization techniques.

We hope that you will enjoy reading these papers as much as we did and we would like to thank the authors for submitting their extended versions of their EuroVis '07 papers. We would also like to thank the people who helped us make this special section of *TVCG* possible. In particular, we are thankful to Thomas Ertl, the Editor-in-Chief of *TVCG*. Last but not least, we would like to thank all the anonymous reviewers that helped us to select the three papers and the authors to improve the submissions for EuroVis '07.

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Ken Museth received the MSc degree in physical chemistry in 1994 and the PhD degree in computational quantum dynamics in 1997, both from the University of Copenhagen, Denmark. He is currently a senior research scientist and developer at the visual effects house Digital Domain (DD). He also holds adjunct professorships at both Linkoping University, Sweden and Aarhus University, Denmark, where he supervises PhDs. Prior to joining DD in early 2007, he held a full professorship in computer graphics at Linköping University. He was at the California Institute of Technology from 1998 to 2003, first as a visiting faculty member in the Chemical Physics Department, and later as a senior research scientist in the Computer Science Department. It was during this period he switched fields from physics to computer graphics. He has acted as scientific consultant to several other visual effects houses and has worked on mission design for NASA's Jet Propulsion Laboratory. He has published more than 50 scientific papers, a significant portion of which are on deforming geometry and level set methods. He is currently on the program committees of ACM SIGGRAPH, the ACM Symposium on Computer Animation, IEEE Visualization, and IEEE EuroVis.

Anders Ynnerman received the PhD degree in physics from Gothenburg University. He is a professor of scientific visualization at Linköping University and also holds a visiting chair in visualization at the Royal Institute of Technology in Stockholm. During the early 1990s, he was doing research at Oxford University, United Kingdom, and Vanderbilt University. From 1997 to 2002, he directed the Swedish National Supercomputer Centre and from 2002 to 2006 he directed the Swedish National Infrastructure for Computing. In 2000, he founded the Norrköping Visualization and Interaction Studio NVIS, which currently constitutes one of the main focal points for research and education in computer graphics and visualization in the Nordic region. He is also one of the cofounders of the Center for Medical Image Science and Visualization (CMIV) and he is currently the chair of the CMIV scientific council. He is involved in several spin-off companies in the area of visualization and scientific computing. His current research interest lies in the area of visualization of large scale and complex data sets with a focus on volume rendering and multimodal interaction. He is an elected member of the Swedish Royal Academy of Engineering Sciences and a board member of the Swedish Research Council. In 2007, he was awarded the Akzo Nobel Science Award and also the Golden Mouse award for Swedish IT-person of the year. In 2007, he cochaired the EuroVis Conference and he is cochairing the 2008 Symposium on Volume Graphics. He is a member of the IEEE, the ACM, and is a board member of the Swedish Computer Graphics Association (SIGRAD). He is currently serving on the program committees of Volume Grahpics, EuroVis, and IEEE Visualization.

Torsten Möller received the Vordiplom (BSc) in mathematical computer science from Humboldt University of Berlin, Germany and the PhD degree in computer and information science from Ohio State University in 1999. He is an associate professor in the School of Computing Science at Simon Fraser University. His research interests include the fields of visualization and computer graphics, especially the mathematical foundations thereof. His main focus is currently on tools for optimal sampling lattices (acquisition, reconstruction, and multi-resolution) as well as the exploration of high-dimensional continuous data. The main application areas are functional medical imaging as well as simulation tools for computational science. He is the director of Vivarium, codirector of the Graphics, Usability and Visualization Lab, and he serves on the Board of Advisors for the Centre for Scientific Computing at Simon Fraser University. He has been appointed Vice Chair for Publications of the IEEE Visualization and Graphics Technical Committee. He is currently serving on the steering committee of the Symposium on Volume Graphics as well as the paper cochair for the 2008 Eurographics/IEEE Symposium on Visualization (EuroVis 2008). Further, he is an associate editor for the *IEEE Transactions on Visualization and Computer Graphics* and the Computer Graphics Forum. He has been a visiting faculty member at the Ecole Polytechnique Fédérale de Lausanne from November 2006 through August 2007, working in the Biomedical Imaging Group. He has also been a visiting faculty member at the Vienna University of Technology from September 2006 through October 2006, working at the Institute of Computer Graphics and Algorithms. He is a member of the IEEE, the ACM, Eurographics, and the Canadian Information Processing Society (CIPS). He served on a number of program committees (including the Eurographics and IEEE Visualization Conferences) and has been a papers cochair for the 2003 Graphics Interface conference, the 2006 Workshop on Volume Graphics (VG '06), the 2007 Eurographics/IEEE Symposium on Visualization (EuroVis '07), as well as the visualization track of the 2007 International Symposium on Visual Computing. He was the general chair for the 2007 Workshop on Volume Graphics (VG '07). He also co-organized the 2004 Workshop on Mathematical Foundations of Scientific Visualization, Computer Graphics, and Massive Data Exploration at the Banff International Research Station.