EGPGV 2021

21st Eurographics Symposium on Parallel Graphics and Visualization

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June 14, 2021

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Preface

This book contains the proceedings of the 21th Eurographics Symposium on Parallel Graphics and Visualization (EGPGV), which took place in Zurich, Switzerland, on the 14th of June, 2021. In this day and age, high-performance graphics and visualization solutions are required in a variety of domains, ranging from making sense of the huge amounts of data coming out of simulations and sensing devices, to delivering realtime immersive experiences that simulate virtual worlds. Such systems are implemented on hardware platforms that are rapidly increasing in complexity, in terms of increasing concurrency, heterogeneity, and depth of memory and storage hierarchies. These factors present unique challenges, to which our community responds with novel methods and approaches for parallel and high-performance graphics and visualization. The EGPGV Symposium aims at fostering the exchange of experiences and knowledge-exploiting and defining new trends in this important computer science area.

As the previous two symposia of the series, EGPGV 2021 had two submission deadlines: early submission in December 2020 and regular submission in March 2021, allowing authors the flexibility to choose between two separate submission deadlines. Additionally, the two review cycles provided an opportunity for early submissions to be improved if found promising but not publication-ready, effectively facilitating a major revision process that stands to increase the quality of EGPGV publications.

This year, we received a total of 6 early submissions and 6 regular submissions. Of the latter, 6 manuscripts were revised after the early review process with substantial improvement. All submissions to each deadline underwent extensive review by a diverse International Program Committee, consisting of 19 persons from around the world having broad and deep expertise in parallel graphics and visualization. Each contribution was independently reviewed by at least four IPC members, selected by the chairs according to their preferences, expertise, and conflicts. The members were assigned as either primary or secondary reviewers. After all the reviews were completed, the reviewers of each contribution conducted an online discussion, resulting in a summary review and recommendation. Based on the recommendations, the reviews, the online discussions, and after a thorough deliberation by the Program Co-Chairs, 6 early submissions and 2 regular submissions were selected for inclusion in the final program, which corresponds to an acceptance rate of 66%. Of the 8 accepted papers, there were 5 Full Papers and 3 Short Papers. This year's papers program covers a variety of subjects, including flow visualization, volumetric techniques, particles, and more.

This year's keynote was delivered by Won-Ki Jeong of Korea University. He presented on high-performance visual computing for large-scale biomedical image analysis, which is an excellent example of parallel visualization and graphics in the medical domain.

We would like to thank Stefanie Behnke (Eurographics) for her help with handling the publications and invaluable assistance with the reviewing system, respectively. We would also like to thank Amani Ageeli of King Abdullah University of Science and Technology (KAUST), who served as the Student Program Chair. Finally, we would like to thank all the members of the IPC, the external reviewers, the authors, and the keynote speaker without whom this symposium would not have been possible.

Markus Hadwiger, Matthew Larsen, and Filip Sadlo
Zurich, Switzerland, June, 2021.

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Keynote

High-Performance Visual Computing For Large-Scale Biomedical Image Analysis

Won-Ki Jeong

Abstract

High-resolution, large-scale image data play a central role in biomedical research, but they also pose challenging computational problems for image processing and visualization in terms of developing suitable algorithms, coping with the ever-increasing data sizes, and maintaining interactive performance. Massively parallel computing systems, such as graphics processing units (GPUs) and distributed cluster systems, can be a solution for such computation-demanding tasks due to their scalable and parallel architecture. In addition, recent advances in machine learning can be another solution by shifting the time-consuming computing process into the training (pre-processing) phase and reducing prediction time by performing only one-pass deployment of a feed-forward neural network. In this talk, I will introduce several examples of such research directions from our work on large-scale biomedical image analysis using high-performance computing and machine learning techniques, for example, how to leverage parallel computing architecture and machine learning algorithms to accelerate tera-scale microscopy image processing and analysis for biomedical applications.

Short Biography

Won-Ki Jeong is currently a full professor in computer science and engineering at Korea University. He was an assistant and associate professor in the school of electrical and computer engineering at UNIST (2011-2020), a visiting associate professor of the neurobiology at Harvard Medical School (2017–2018),and a research scientist in the Center for Brain Science at Harvard University (2008–2011). His research interests include visualization, image processing, and parallel computing. He received a Ph.D. degree in Computer Science from the University of Utah in 2008 where he was a member of the Scientific Computing and Imaging (SCI) institute. He hosted the NVIDIA GPU Research Center at UNIST in 2014. He co-authored chapters in GPU Gems published in 2011 and published more than 60 refereed research articles.