



# Smart Tools and Applications in computer Graphics

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## Eurographics Italian Chapter Conference

**Cagliari, Italy**  
**November 14 – 15, 2019**

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## Preface

These are the proceedings of the 6th edition of the Smart Tools and Applications in Graphics (STAG) conference, which is the annual international conference organized by the Italian Chapter of the Eurographics association. This year STAG has been held in Cagliari (Italy) on November 14-15, 2019, and organized by the Visual Computing Group of CRS4 (Center for Advanced Studies, Research and Development in Sardinia) and the University of Cagliari. The aim of the conference is the dissemination of research activities and novel ideas on both theoretical and application oriented aspects of Computer Graphics, bringing together researchers and practitioners from both national and international scientific community to share their latest developments.

This year, we have received 26 submissions, 21 full papers and 5 posters. Each paper/poster underwent extensive review by a diverse International Program Committee, consisting of 30 persons from around the world having broad and deep expertise in Computer Graphics and Computer Vision, and related disciplines. Each contribution was independently reviewed by at least four IPC members, selected by the chairs according to their preferences, expertise, and conflicts. The final decision has been made based on the reviewers' recommendations, the individual reviews, the online discussions, and after a thorough deliberation by the program co-chairs. Thirteen papers have been accepted as full papers. Among five posters, four have been accepted and one has been rejected. In addition, six rejected full papers have been invited to submit a two-page shortened version as a poster. Only one of them accepted this invitation, while the others decided to withdraw the submission. Three papers have been clearly identified by the reviewing scores and reviewers' comments as natural nominees for the best paper award.

STAG2019 accepted full papers contributions cover new ways to solve real problems, clever solutions to optimize or otherwise improve known techniques and algorithms for real-world applications, and system, library and workflow papers with documented impact on real-world applications. The poster track includes preliminary works that present recent results, work in progress, new ideas and small-scale projects which may be of interest to the community. The general aim has been to create a good opportunity for displaying and discussing ideas, and to foster research activities in all areas of Computer Graphics, Computer Vision, Visual Computing, and related disciplines.

The STAG2019 technical program started with a high-class invited presentation. Prof. Dr. Renato Pajarola, director of the Visualization and Multimedia Lab of the Department of Informatics - University of Zurich, gives a keynote talk titled "3D Indoor Reconstruction from Point Clouds", which reviews their activities and related work on the automatic extraction of architectural 3D models from scanned interior environments as well as the extraction of higher-level and abstract semantic information. The technical paper program consists of 4 sessions of full papers and one poster welcome reception. The first full paper session is devoted to the presentation of the Best Paper Award Nominees, a selection of the three most outstanding papers. The other three sessions include clusters of papers that cover three main general topics, i.e., "Geometry", "Representation & Synthesis", and "Libraries".

This STAG would not have been possible without contributions by many persons. We thank all authors for submitting their work to STAG2019 for review. We also thank the hard work of the members of the STAG 2019 International Program Committee, who provide high quality reviews and useful comments for authors to improve their contributions. We also thank all the chairs. These proceedings would not have been possible without the great help of Stefanie Behnke of Eurographics, who tirelessly worked with the paper co-chairs on the proceedings production.

## **International Program Committee**

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## Keynote

### 3D Indoor Reconstruction from Point Clouds

*Prof. Dr. Renato Pajarola*

Director of the Visualization and Multimedia Lab  
Department of Informatics - University of Zurich

#### Abstract

Thanks to the widespread availability, ease-of-use and low costs of modern 3D acquisition technologies, it is nowadays possible to acquire highly detailed digital 3D models of large real-world environments quickly and in a cost-effective way. In particular, the availability of accurate virtual 3D models of interiors has opened up new opportunities in the application contexts of real-estate digital asset management, building and facility maintenance, construction and engineering, or interior space planning and design. Through the extension of BIMs with detailed virtual 3D models, new activities and tasks based on virtual facilities inspection, interactive building exploration and immersive property showcasing can be tackled. In this talk I will review our activities and related work on the automatic extraction of architectural 3D models from scanned interior environments as well as the extraction of higher-level and abstract semantic information.

#### Short Biography

Renato Pajarola is a full Professor in the Department of Informatics at the University of Zurich (UZH). He received a Dipl. Inf-Ing ETH as well as a Dr. sc. techn. degree in computer science from the Swiss Federal Institute of Technology (ETH) Zurich in 1994 and 1998 respectively. Subsequently he was a post-doctoral researcher and lecturer in the Graphics, Visualization & Usability Center at Georgia Tech. In 1999 he joined the University of California Irvine as an Assistant Professor where he established the Computer Graphics Lab. Since 2005 he has been leading the Visualization and MultiMedia Lab at UZH. He is a Senior Member of ACM and IEEE as well as a Fellow of the Eurographics Association. Dr. Pajarola's research interests include interactive large-scale data visualization, real-time 3D graphics, 3D scanning & reconstruction, geometry processing, as well as remote and parallel rendering. He has published a wide range of internationally peer-reviewed research articles in top journals and conferences. Prof. Pajarola regularly serves on program committees, such as for example the IEEE Visualization Conference, Eurographics, EuroVis Conference, IEEE Pacific Visualization or ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games. He organized and co-chaired the Eurographics Conference in 2015, chaired the 2010 EG Symposium on Parallel Graphics and Visualization and was papers co-chair in 2011, and also of the 2007 and 2008 IEEE/EG Symposium on Point-Based Computer Graphics. His recent co-authored papers received a SPIE Best Paper Award in 2013, a Best Student Paper at the Pacific Graphics Conference, an Honorable Mention Award at the ACM SIGGRAPH Symposium on Visualization in 2016, and a Best Paper Award (2nd) at the Computer Graphics International Conference in 2018.