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42^{nd} Annual Conference

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FOR COMPUTER GRAPHICS

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(Guest Editors)

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Preface

This issue of the Computer Graphics Forum contains the technical full papers program of the Eurographics Association 42nd annual conference, held (virtually) from Vienna, Austria from 3-7 May 2021. The Eurographics annual venue presents a unique opportunity to present outstanding technical contributions in computer graphics. The full papers selected for publication in the Computer Graphics Forum journal are arguably the most prestigious feature of the conference.

The technical paper selection process involved a group of 67 experts forming the International Program Committee (IPC). We received a total of 129 full submissions. A sorting committee, consisting of the two Co-Chairs and five advisory board members (Jan Kautz, Sylvain Lefebvre, Belen Masia, Daniele Panozzo, Michael Wimmer), subsequently assigned each paper to two IPC members, as either primary or secondary reviewer, up to five papers, respecting to their preferences, expertise, conflicts, and automatically computed matching scores between IPC members and submitted papers.

After the initial five reviews per submission were collected, the authors had five days to consult these reviews and write a 1000-word rebuttal, addressing key questions and potential misinterpretations. Finally, all reviewers assigned to a paper read the rebuttal and all reviews and together reached an initial decision.

This year, following an established tradition that started in 2012 and improved continuously through the years, we replaced the traditional in-person IPC meeting with a one-week virtual asynchronous meeting where the discussions between the IPC members leading to the final decisions were performed off-line by a bulletin board and other means of personal communication. This led to extensive discussions where papers and reviews were debated extensively involving other IPC members as extra readers when needed. Each paper had a public discussion board, and each and every IPC member contributed to discussions where they felt competent.

All papers conditionally accepted with minor revisions went through a short second review cycle, with evaluations from the primary reviewer, and sometimes the secondary reviewer, before being finally accepted. In the end, 47 papers out of the 129 full submissions were accepted with minor revisions for a 36% acceptance rate, while 3 were recommended to a fast-track review process with major revisions to be considered for publication in a future issue of Computer Graphics Forum. This year we had papers on a diverse range of topics including geometry, analysis exploration of images, RGBD scans, and videos, rendering, generative modeling, computational fabrication, pose manifolds, material acquisition, shape analysis, physical simulations, flow visualization, skinning and deformation, and expressive modeling.

All accepted full papers are published as open-access Computer Graphics Forum journal papers. It is worth noting that for all submissions conflict-of-interest was managed on all levels, from reviewers, committee, advisory board, best paper committee, up to the chairs. The review process was double-blind and in case the original set of reviewers did not conclude with a decision, additional reviewers were invited to perform a full review and assist the decision process. Best papers were selected by a dedicated awards committee who selected among the top 12 papers based on overall review scores.

We would like to thank everyone who made this possible. First and foremost, we are grateful to all the members of the IPC who dedicated a remarkable amount of their time to finding tertiaries, reviewing and discussing papers, and subsequently shepherded the accepted papers undergoing the minor revision cycle. We wish to thank all the reviewers, who provided 664 high-quality and thoughtful reviews and, of course, all the authors for their efforts in preparing and revising the submitted papers. We are especially grateful to Michael Wimmer who shared with us the insights from previous years and was indefatigable with his help and assistance. We would like to express strong appreciation to the advisory board for their support with paper sorting. Last but not least, we would like to thank Stefanie Behnke from Eurographics Publishing for her outstanding support with SRM functionality for her responsiveness which was the key to the successful outcome of the paper selection process. We are particularly proud of the effort having had to work around challenges imposed by the pandemic and the recurring lockdowns surrounding that.

We are very happy to present the full paper proceedings of Eurographics 2021. We believe that these papers reflect the best of extraordinary computer graphics research. It was both an honor and a pleasure for us to lead this selection process and we hope that you will find both the articles and the entire conference thought-provoking and inspiring of your future endeavors.

Ivan Viola and Niloy J. Mitra
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Eurographics Outstanding Technical Contributions Award 2021: Paolo Cignoni

Paolo Cignoni is Research Director at CNR-ISTI and head of the Visual Computing Laboratory. He received his PhD in Computer Science at the University of Pisa in 1998. He is a fellow of the Eurographics Association and has been awarded the First Eurographics Young researcher award in 2004.

The research of Paolo Cignoni has been highly influential and is genuinely pioneering. His primary technical contributions cover the entire 3D content creation pipeline, from scanning, analyzing, and processing 3D geometry to visualizing and digitally fabricating geometric models. His early work on mesh simplification and multi-resolution modeling has shaped the field of geometry processing in its early days. He has developed new algorithms to approximate geometric models with controlled error, thus enabling scalable processing of the large geometric data sets that emerged through the proliferation of 3D scanning technologies. His seminal paper Metro: Measuring Error on Simplified Surfaces (1998) is the third most widely cited paper appeared in Computer Graphics Forum (following WoS).

Beyond advancing theoretical concepts, Paolo Cignoni's work is distinguished by high practical relevance. For example, his paper on Polycube-Maps has been quickly and widely adopted both in research and industry to simplify texture mapping on complex domains with easy integration on modern graphics hardware. He is the leading force behind the development of MeshLab, the popular open-source system for processing raw 3D meshes, with wide-ranging functionalities for editing, cleaning, inspecting, rendering, texturing and converting meshes. This exceptional effort has enabled numerous researchers and practitioners "to stand on the shoulders of giants", by providing easy access to a wealth of geometric processing methods that have been developed by him and his team and within the broader scientific community.

Paolo Cignoni is also one of the pioneers of the emerging field of computational fabrication. He proposed innovative algorithmic solutions for the design and optimization of fabricable geometric models, ranging from micro-structures to large scale architectural designs, such as the Flexmaps Pavilion that was awarded the IASS Form and Force Competition Prize. He has applied his extensive expertise in 3D scanning, geometry processing, and digital fabrication to the field of Cultural Heritage. He proposed novel digital methods to accurately acquire, visualize, and physically replicate cultural artifacts, thus linking his technical research to questions of profound cultural and societal importance.

Paolo Cignoni is a highly prolific researcher who has published more than 200 papers. He is an active member of the scientific community where he regularly serves on major program committees as well as the editorial boards of many leading journals. He co-chaired the Eurographics conference in 2012 and is currently a member of the Executive Committee of the Eurographics Association and an EG Fellow.

Eurographics is pleased to recognize Paolo Cignoni with the 2021 Outstanding Technical Contributions Award.

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Eurographics Young Researcher Award 2021: Tobias Günther

Tobias Günther is awarded the EUROGRAPHICS Young Researcher Award 2021. He received his MSc in Computer Science at Magdeburg University with highest honors in 2013. He then received his PhD in Visualization and Computer Graphics from Magdeburg University (summa cum laude) in 2016, under the supervision of Holger Theisel. From 2016 until 2020 he was a postdoc in the Computer Graphics Lab at ETH Zürich. In 2020, he became a professor of visual computing (W2) at the Friedrich- Alexander University of Erlangen-Nuremberg.

Günther has made a large number of original, methodically deep and widely recognized contributions to the area of visualization. More specifically, he contributed several important new methods for the visualization of high-dimensional and time-varying data, as well as for the feature-based visualization of flow data. As an example, he proposed new techniques from light transport in heterogeneous participating media to the unbiased rendering of features in Lagrangian scalar fields. In flow visualization, Tobias Günther made a number of contributions in extracting and visualizing integral geometry, studying the vortical motion and separation behavior of particles, and extending traditional massless particle visualization to finite-sized objects.

His academic portfolio is versatile, including works on rendering in top graphics venues. For example, he proposed a new technique to accelerate Monte Carlo rendering to provide faster feedback and more control for artists. Furthermore, he explored real-time rendering solutions that efficiently mimic natural phenomena, such as interactive material aging simulations. More recently, he is investigating cross-sectional algorithmic concepts at the intersection of machine learning, specifically deep learning, and flow visualization.

Günther is the recipient of an impressive number of important awards, such as the EUROGRAPHICS PhD Thesis Award, IEEE Visualization and Graphics Technical Committee (VGTC) Dissertation Award, Best Paper Award at TopoInVis, as well as Best Paper Honorable Mentions at EUROGRAPHICS and IEEE Visualization.

Eurographics is pleased to recognize Tobias Günther with the 2021 Young Researcher Award.

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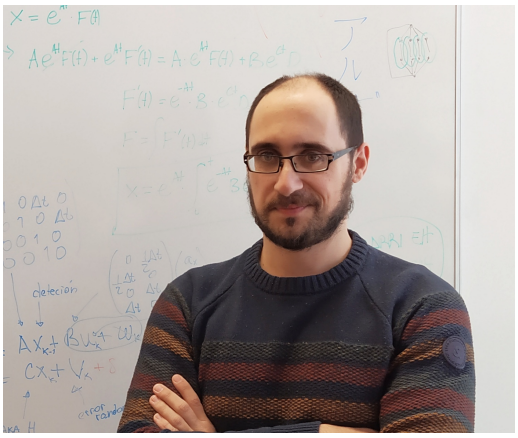

Adrián Jarabo receives the EUROGRAPHICS Young Researcher Award 2021. He obtained his PhD in Computer Graphics from the Universidad de Zaragoza, where he was advised by Prof. Diego Gutierrez. He is now an Assistant Professor at Universidad de Zaragoza (Spain), where he works on topics in computer graphics and computational imaging.

Adrian Jarabo has done highly original, methodically deep, and widely cited work on the different aspects of physically-based light transport, including simulation and appearance modeling. He also worked on research questions in the areas of perception and light field editing. In 2017, he received the EUROGRAPHICS PhD Award.

A highlight of his research are his seminal contributions to the area of light transport modeling for transient and non-line-of-sight imaging. This is an emerging and very exciting research area at the intersection of optics, computational imaging and computer graphics. For example, he presented seminal new techniques to capture and visualize the propagation of light in space. He also proposed new techniques to effectively simulate and analyze transient light transport, where the speed of light can no longer be considered infinite, by means of computer graphics. Furthermore, he developed new ways to solve challenging inverse problems arising in transient imaging. An example from his recent work in this domain is a new approach for non-line-of-sight imaging with a new wave optical approach, which was published in the journal Nature.

The work of Adrián Jarabo is published in the top conferences and journals in computer graphics and optics and is widely cited. The fact that one of his works was published in the journal Nature speaks to the impact of his work in the scientific community at large.

Eurographics is pleased to recognize Adrian Jarabo with the 2021 Young Researcher Award.