Smart Tools and Applications in Graphics

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Eurographics Italian Chapter Conference

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Table of Contents

Table of Contents

Preface

« The feeling, which is palpable the moment you enter Matera, is that you are a rather fragile being, skating across the rock-hard surface of mortality itself. You are temporary. Matera is not. (Michael Cunningham, Pulitzer Prize) »

Welcome to Matera, one of the most ancient cities in the entire world!

With a history of continuous occupation dating back to the Palaeolithic (10th millennium BCE), Matera is renowned today for its rock-cut urban core, whose twin cliffside zones are known collectively as the Sassi. The Sassi originated in prehistoric times and are the first human settlement in Italy. These dwellings were dug into the calcareous rock, which resulted in the creation of small caverns. For centuries, the citizens of Matera lived in these habitations that remained unaffected by industrial progress and modernization. However, during the Italian economic boom, the glorious Sassi became a symbol of poverty and unhealthy living conditions. In recent decades, Matera has experienced an incredibly vigorous resurgence. In 1993, UNESCO declared the Sassi di Matera a World Heritage Site. On this occasion, UNESCO, for the first time, used the concept of a Cultural Landscape in its criteria and justifications, which later became a standard for motivating the inscription of other sites worldwide. The declaration of UNESCO has assisted in attracting tourism and accelerated investments to restore historic dwellings. In 2019, Matera was declared a European Capital of Culture. Today, Matera has revitalized its Sassi into boutique hotels, restaurants, and artisan shops, seamlessly combining traditional and modern values. It welcomes visitors to experience its timeless beauty and rich history, offering an immersive journey into the past within a vibrant ambiance. In 2022, Matera was recognized as the most welcoming city in the world.

This year, STAG has reached its tenth edition. After hosting STAG in past years in Verona, Cagliari, Brescia, Genoa, and Rome, Matera will host the 2023 edition of STAG for the first time. The purpose of this conference is to provide a chance to foster and stimulate fruitful collaboration and exchange of knowledge and ideas within the Italian Computer Graphics Community. This conference is the outcome of the work of plenty of skillful researchers and professionals that we would like to thank for an undoubtedly successful conference. First of all, the program committee members were able to ensure deep and, at the same, timely reviews of the papers submitted. Given the tight schedule we had, it was a challenging task to accomplish, and the quality of the papers presented was greatly dependent on the comments and suggestions they provided to the authors. Thanks!

We also want to express our gratitude for the contributions of our invited speakers who have set a high scientific level for the conference with their international scientific experience. Therefore, we thank Prof. Ana Serrano from the Graphics and Imaging Lab of Universidad de Zaragoza, Spain, and Prof. Adrien Bousseau from GraphDeco research group from Inria Centre at Université Côte d'Azur, France. A special thanks to Stefanie Behnke of Eurographics, who tirelessly and constantly supported the chairs and the authors in their goal to produce the best quality proceedings that could be obtained. Locally, we enjoyed the support of the CTE (Casa delle Tecnologie Emergenti/House of Emerging Technologies), whose headquarters within a historic building in the center of the Sassi of Matera hosts this edition of STAG. The House of Technologies (CTE) is a project initiated in August 2020 by the Municipality of Matera and funded with 15 million euros from MIMIT (Ministry of Enterprises of Made in Italy) to support emerging technologies. In the San Rocco headquarters, the Municipality has provided spaces to accommodate this significant investment in technologies, know-how, and collaboration between research institutions and

businesses. Matera was the first city in Italy to host the concept of a physical space to support these objectives. Last but not least, we would also like to thank our sponsors, Università degli Studi della Basilicata and the Dipartimento di Matematica, Informatica ed Economia, for supporting the organization of the conference.

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Author Index

Invited Speaker

Understanding User Behavior and Attention In Immersive Environments

Ana Serrano
Universidad de Zaragoza

Abstract

Virtual reality (VR) is an exciting and rapidly growing medium that presents both challenges and opportunities. As VR techniques and applications continue to blossom, creating engaging experiences that exploit their potential becomes increasingly important.

Understanding and being able to reliably predict human visual behavior is an essential factor in achieving this goal. This knowledge can be the key to designing more engaging storytelling experiences and developing efficient content-aware compression and rendering techniques that take into account users' attentional patterns and behavior.

In this talk, we will explore approaches and challenges involved in modeling visual attention and gaze behavior in immersive 360º environments. By studying how users allocate their attention and direct their gaze, we can uncover valuable insights for creating immersive VR experiences.

Short Biography

Ana Serrano is an Assistant Professor at Universidad de Zaragoza (Spain). Previously she was a Postdoctoral Research Fellow at the Max-Planck-Institute for Informatics. She received her PhD in Computer Science in 2019. She was the recipient of an Adobe Research Fellowship honorable mention in 2017, and a NVIDIA Graduate Fellowship in 2018. Her doctoral thesis was recognized with one of the Eurographics 2020 PhD awards and she was recognized with the Eurographics Young Researcher Award in 2023. Her research focuses on various areas of visual computing, including computational imaging, material appearance perception and editing, and virtual reality. She is particularly interested in using perceptually-driven approaches to improve user experiences and develop tools to assist content creation.

Invited Speaker

Interpreting Drawings for 3D Design - A Semi-Discrete Optimization Problem

Adrien Bousseau
Inria Sophia-Antipolis

Abstract

Designers draw extensively to externalize their ideas and communicate with others. But drawings are currently not directly interpretable by computers. To test their ideas against physical reality, designers have to create 3D models suitable for simulation and 3D printing. However, the visceral and approximate nature of drawing clashes with the tediousness and rigidity of 3D modeling. As a result, designers only model finalized concepts, and have no feedback on feasibility during creative exploration.

The long term goal of our group is to bring the power of 3D engineering tools to the creative phase of design by automatically estimating 3D models from drawings. However, this problem is ill-posed: a point in the drawing can lie anywhere in depth. Our originality is to exploit professional drawing techniques that designers developed to communicate shape most efficiently. Each technique provides geometric constraints that help viewers understand drawings, and that we shall leverage for 3D reconstruction.

In this talk, I will present a general mathematical formulation of geometry-based line drawing reconstruction. A key challenge of this formulation resides in identifying where the geometric constraints provided by different drawing techniques should apply, before solving for the 3D reconstruction that best satisfies these constraints. The resulting optimization problem combines both binary and continuous variables, for which we propose dedicated solvers that take advantage of the way designers construct their drawings.

Short Biography

Adrien Bousseau is a researcher at Inria Sophia-Antipolis in the GraphDeco research group. He did his Ph.D. at Inria Rhône-Alpes and his postdoc at UC Berkeley. He also did several internships at Adobe Research. Adrien does research on image creation and manipulation, with a focus on drawings and photographs. Most notably he worked on image stylization, image editing and relighting, vector graphics, and sketch-based modeling. He received one of the three Eurographics 2011 Ph.D. award for his research on expressive image manipulations, and a young researcher award from the French National Research Agency (ANR) for his work on computer-assisted drawing. He received an ERC Starting Grant to work on drawing interpretation for 3D design.