

# **Pacific Graphics 2022**

The 30th Pacific Conference on Computer Graphics and Applications

Kyoto, Japan  
October 5 – 8, 2022

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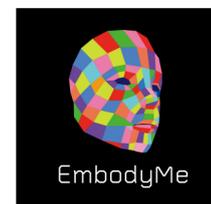
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## Preface

The 30th Pacific Conference on Computer Graphics and Applications (Pacific Graphics 2022) was hosted in Kyoto, Japan. As a highly successful conference series, Pacific Graphics provides a premium forum for researchers, developers, and practitioners from around the world to present and discuss new problems, solutions, and technologies in computer graphics and related areas. Due to the COVID-19 pandemic, there has been no physical conference for two years. This year, Pacific Graphics will be held as an onsite/online hybrid conference providing a place for active academic discussion while ensuring the safety of the participants.

Pacific Graphics 2022 offered two submission tracks: a journal track and conference track. The journal track accepts full paper submissions that are intended to be published in Computer Graphics Forum once accepted. The journal track received 145 valid submissions. With the help of 81 International Program Committee members and 52 external reviewers, each submission was evaluated during a rigorous review process. First, the program co-chairs matched the submitted paper's topic to the expertise and preferences of International Program Committee members and assigned each submission to the members as a primary and a secondary reviewer. Then, the external reviewers were invited by the primary reviewers to ensure there are at least three reviews for each paper. After all reviews and individual recommendation scores had been collected, we gave the authors a chance to write a rebuttal based on the reviews. The rebuttals are used to clarify questions raised in the reviews in the following discussion phase. Each recommendation was based on a consensus among all the reviewers after discussion. Some of the full paper submissions were asked to shorten the paper into a short paper to match the paper length to the amount of contribution. Finally, conditionally accepted full/short papers underwent a second review cycle to include the revisions required in the review summary.

Out of 145 submissions, 56 full papers (acceptance rate: 38.6%) and 4 short papers were finally accepted. Their authors were offered the chance to present their work in Pacific Graphics 2022 either remotely or in-person at the conference venue in Kyoto. The accepted full papers are published in this special issue of Computer Graphics Forum. Another 11 papers were referred to the regular submission process of Computer Graphics Forum due to required major revisions.

Aside from the journal track program, Pacific Graphics 2022 offered a conference track program that accepted short papers, work-in-progress papers, and posters. The conference track program provides an opportunity for authors to display late-breaking technical achievements that are not yet ready for full publication. We accepted submissions of 19 short papers, 3 posters, and 1 work-in-progress paper. After the reviews by the international committee members and external reviewers, 5 short papers, 3 posters, and 1 work-in-progress paper were accepted to the conference track program. These papers are also invited to present their work at Kyoto during PG2022. All accepted full papers, short papers, posters, and work-in-progress papers are published electronically through the EG Digital Library.

We are deeply grateful to all the people that have contributed their time and hard work to the evaluation process, including the members of the International Program Committees and all the external reviewers. We thank conference track program chairs Yin Yang, Amal D. Parakkat, Bailin Deng, and Seung-Tak Noh for managing the evaluation process of the conference track submissions. We also thank Stefanie Behnke for her efforts with the submission management system, Pierre Alliez for his help on referrals to CGF, and Yoshinori Dobashi, Sangyoung Lee, and Takeo Igarashi for their valuable advice. Finally, we would like to thank all the authors who were involved in the submission process for supporting the Pacific Graphics 2022 conference, and congratulate them on their high quality work.

Thank you very much and we hope to see you soon in Kyoto.

Program Co-Chairs Nobuyuki Umetani, Etienne Vouga, Chris Wojtan

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## Invited Talk

### Material-driven Realization of 3D Surfaces

*Mirela Ben-Chen*

#### Abstract

Many applications of geometry processing involve realizing, or fabricating, a 3D model designed using a modeling software. While the realization mechanisms are quite varied, many of the underlying mathematical constraints that allow a seamless transition from modeling to the realization of 3D models are similar across domains. Often, these mechanisms involve meshing, where an idealized smooth surface is sampled using discrete building blocks, such as planar panels, thin wires, or yarn stitches. In this talk we will survey the challenges of mesh realization using different materials, present solutions using discrete tangent vector fields, and demonstrate them in different applications.

#### Short Biography

Prof. Ben-Chen is an Associate Professor at the Center for Graphics and Geometric Computing of the CS Department at the Technion. She has received her Ph.D. from the Technion in 2009, was a Fulbright postdoc at Stanford from 2009-2012, and then started as an Assistant Prof. at the Technion in 2012.

## Invited Talk

### AI Synthesis for Metaverse Capabilities & Nextgen AI VFX

*Hao Li*

#### Abstract

As the world is getting ready for the metaverse, the need for 3D content is growing rapidly, AR/VR will become mainstream, and next era of the web will be spatial. A digital and immersive future is unthinkable without telepresence, lifelike digital humans, and photorealistic virtual worlds. Existing computer graphics pipelines and technologies rely on production studios and a content creation process that is time consuming and expensive. My research is about developing novel 3D deep learning-based techniques for generating photorealistic digital humans, objects, and scenes and democratizing the process by making such capability accessible to anyone and automatic. In this talk, I will present state-of-the-art technology for digitizing an entire virtual 3D avatar from a single photo developed at Pinscreen, and give a live demo. I will also showcase a high-end neural rendering technology used in next generation virtual assistant solutions and real-time virtual production pipelines. I will also present a real-time teleportation system that only uses a single webcam as input for digitizing entire bodies using 3D deep learning. Furthermore, I will present our work with UC Berkeley on real-time AI synthesis of entire scenes using NeRF representations and Plenotrees. Finally, I will showcase our latest work in AI-VFX where we developed a neural rendering pipeline for facial reenactment and visual dubbing. In particular, we were the first to complete an entire feature film that is lip synced from German/Polish to English. My goal is to enable new capabilities and applications at the intersection of AI, vision, and graphics and impact the future of communication, human-machine interaction, and content creation. At the same time, we must also prioritize the safety and well-being of everyone while architecting this future.

#### Short Biography

Dr. Hao Li is an associate professor of computer vision at MBZUAI and the CEO of Pinscreen. Li's area of expertise lies at the intersection of computer vision, computer graphics, and machine learning, with a focus on virtual humans, reality capture, and AI synthesis. His goal is to enable new AI and immersive technologies that can make the concept of the metaverse possible and enhance our lives with digital experiences that are otherwise not possible in the physical world.

## Invited Talk

### Data-Driven Geometry Processing - without 3D Data

*Rana Hanocka*

#### Abstract

Much of the current success of deep learning has been driven by massive amounts of curated data, whether annotated and unannotated. Compared to image datasets, developing large-scale 3D datasets is either prohibitively expensive or impractical. In this talk, I will present several works which harness the power of data-driven deep learning for tasks in geometry processing, without any 3D datasets. I will discuss works which reconstruct surfaces from noisy point cloud data without any 3D datasets. In addition, I will demonstrate that it is possible to learn to edit 3D geometry using large image datasets.

#### Short Biography

Dr. Rana is an Assistant Professor of Computer Science at the University of Chicago. She founded and direct 3DL (threedle! ), a group of enthusiastic researchers passionate about 3D, machine learning, and visual computing. She obtained my Ph.D. in 2021 from Tel Aviv University under the supervision of Daniel Cohen-Or and Raja Giryes.