

Guest Editor's Introduction to the Special Section on the ACM Symposium on Interactive 3D Graphics and Games (I3D)

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THIS special issue of *IEEE Transactions on Visualization and Computer Graphics (TVCG)* includes four extended papers from the 2016 *ACM Symposium on Interactive 3D Graphics and Games*. This edition marks the 20th conference since its inauguration in 1986. The main focus of I3D is on disseminating novel techniques in computer graphics and human-computer interaction with an emphasis on practical applications such as digital games. The proposed solutions cover a wide range of areas within the field, including rendering, animation, imaging, simulation, and interaction. Many of these techniques find practical applications in many fields, particularly in the game industry.

I3D 2016 was held on February 27th and 28th, 2016 in Redmond, Washington, USA. The conference venue was within DigiPen Institute of Technology, thereby sparking connections between researchers and practitioners developing state of art techniques in graphics, HCI, and gaming. The conference received a total of 48 paper submissions of which 20 were accepted via a rigorous peer review process. The international papers committee (IPC) was comprised of 49 experts from academia as well as industry. Papers which received high scores from reviewers were invited to submit extended versions to *TVCG*. These papers, presented in this issue, then underwent the full *TVCG* review process.

This year's papers include novel interactive techniques for lighting, radiosity, transparency, and crowd simulation. Fast estimation of illumination from large emitters has been a major challenge for real-time shading. In "Accurate Analytic Approximations for Real-Time Specular Area Lighting", which won the best paper and presentation awards, the authors address this challenge using an analytical formulation for integrating illumination from polygonal light sources and use it to shade specular reflectors. "Sequential Monte Carlo Instant Radiosity" proposes the first interactive global illumination algorithm that works in complex, highly-occluded environments by placing and maintaining virtual point light sources via a novel heuristic sampling method. In "Path Patterns: Analyzing and Comparing Real

and Simulated Crowds", the authors propose a new approach based on machine learning to find latent path patterns in both real and simulated crowd data for analysis and comparison. Translucent objects are pervasive in cinematic environments but are difficult to simulate in real-time. "A Phenomenological Scattering Model for Order-Independent Transparency" introduces the first real-time rasterization algorithm that can simultaneously approximate a variety of transparency phenomena, including wavelength-varying transmission, translucent colored shadows, caustics, partial coverage, diffusion, and refraction.

In addition to the papers program, I3D 2016 also included posters, demonstration (demo) sessions, a games industry panel and a keynote by Hao Chen, a veteran in the gaming industry. We are extremely grateful to the IPC as well as everyone involved in the organization of the various programs that contributed to the success of the conference and its dissemination of many high quality works, ACM SIGGRAPH for the continual sponsorship, and financial supports from Activision, Intel, Microsoft, 2K, Narkii, Disney Research, and NVIDIA. Finally, we thank *TVCG* for continuing to provide this opportunity, which provides further exposure some of the top innovations from I3D.



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Li-Yi Wei received the PhD degree from Stanford University. He is a professor with the University of Hong Kong. Before that he has been a researcher with Microsoft Research and 3D graphics architect with NVIDIA. He investigates repetitive phenomena - between small and large, simple and complex, past and future, and develops methods, interfaces, and applications in computer graphics and human-computer interaction.

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