Pacific Graphics 2017

The 25th Pacific Conference on Computer Graphics and Applications

Taipei, Taiwan
October 16 – 19, 2017

Conference Co-Chairs

Leif Kobbelt, RWTH Aachen University
Jung Hong Chuang, National Chiao Tung University
Bing-Yu Chen, National Taiwan University

Program Co-Chairs

Jernej Barbic, University of Southern California
Wen-Chieh Lin, National Chiao Tung University
Olga Sorkine-Hornung, ETH Zurich

Organizers

Sponsors

Ministry of Science and Technology

DIGITAL DOMAIN

RAY ARK

NTU IOX center

CyberLink

www.cyberlink.com

ITRI
Industrial Technology
Research Institute

IGS

Preface

The 25th Pacific Conference on Computer Graphics and Applications (Pacific Graphics 2017) was held in Taipei, Taiwan, on October 16-19, 2017. Pacific Graphics is one of flagship conferences of Asia Graphics Association. As a highly successful conference series, Pacific Graphics provides a premium forum for researchers, developers, and practitioners in the Pacific Rim and around the world to present and discuss new problems, solutions, and technologies in computer graphics and related areas.

There were 98 papers submitted, which were reviewed by a program committee of 102 international experts, as well as 195 external reviewers. Of these submissions, 22 papers were selected for full oral presentation at the conference, as well as for inclusion in this issue of Computer Graphics Forum. Each paper received at least 4 reviews by members of the program committee and external experts. Each of the accepted papers underwent a second review cycle to ensure that the necessary revisions indicated in the reviews were carried out.

In addition to the paper presentations, the conference also featured three invited talks by Hirokazu Kato, Johannes Kopf, and Miguel A. Otaduy. There was also a short paper session, where seven short papers were presented. The short papers are published electronically through the EG Digital Library. The topics of the papers in this volume are diverse, including fabrication and design, analyzing geometries, coloring rendering and sampling, video and visualization, interaction and creation, reconstruction and generation based on RGBD Images, representing and editing Images, and simulation and animation. Some of the papers were submitted with supplementary materials that EUROGRAPHICS members can access through the EG Digital Library.

We would like to thank the authors and participants at the conference, the program committee members, and the external reviewers, all of whom made their best effort to ensure the high quality of the Pacific Graphics 2017 technical program. We also wish to thank The Ministry of Science and Technology of Taiwan, Digital Domain Holdings Limited, Rayark Inc., NTU IoX Center, CyberLink Corp., Industrial Technology Research Institute, and International Games System Co. Ltd, for their financial support. Finally, we would like to thank Stefanie Behnke, whose administrative help and technical support was invaluable.

Jernej Barbic, University of Southern California, USA
Wen-Chieh Lin, National Chiao Tung University, Taiwan
Olga Sorkine-Hornung, ETH Zurich, Switzerland

Pacific Graphics 2017 Program Co-chairs

International Program Committee

Hujun Bao, Zhejiang University
Connelly Barnes, University of Virginia
Christopher Batty, University of Waterloo
Bernd Bickel, Disney Research Zurich
David Bommes, RWTH Aachen
Nicolas Bonneel, CNRS
Stefan Bruckner, University of Bergen
Marcel Campen, New York University
Bing-Yu Chen, National Taiwan University
Guoning Chen, University of Houston
Ming-Te Chi, National Chengchi University
Hung-Kuo Chu, National Tsing Hua University
Yung-Yu Chuang, National Taiwan University
Stelian Coros, Carnegie Mellon University
Carsten Dachsbacher, Karlsruhe Institute of Technology
Zhigang Deng, University of Houston
Olga Diamanti, Stanford University
Yoshinori Dobashi, Hokkaido University
Zhao Dong, Autodesk
Christian Duriez, INRIA
Kenny Erleben, University of Copenhagen
Xianfeng Gu, Stony Brook University
Diego Gutierrez, University of Zaragoza
Toshiya Hachisuka, The University of Tokyo
Shimin Hu, Tsinghua University
Hui Huang, Shenzhen University
Qixing Huang, University of Texas at Austin
Alec Jacobson, University of Toronto
Eakta Jain, University of Florida
Wenzel Jakob, EPFL
Stefan Jeschke, NVIDIA Research
Tao Ju, Washington University in St. Louis
Oliver van Kaick, Carleton University
Vladimir G. Kim, Adobe
Young J. Kim, Ewha Womans University
Min H. Kim, KAIST
Leif Kobbelt, RWTH Aachen University
Taku Komura, Edinburgh University
Yu-Kun Lai, Cardiff University
Yu-Chi Lai, National Taiwan University of Science and Technology
Jean-Francois Lalonde, Laval University
Manfred Lau, Lancaster University
Tong-Yee Lee, National Cheng Kung University
Seungyong Lee, Pohang University of Science and Technology

International Program Committee

Hao Li, University of Southern California
Steve Lin, Microsoft Research Asia
I-Chen Lin, National Chiao Tung University
Yang Liu, Microsoft Research Asia
Feng Liu, Portland State University
Ligang Liu, University of Science and Technology of China
Kwan-Liu Ma, University of California at Davis
Belen Masia, University of Zaragoza
Dominik Michels, KAUST
Niloy Mitra, University College London
Rahul Narain, University of Minnesota
Junyong Noh, KAIST
Carol O'Sullivan, Trinity College Dublin
Miguel Otaduy, URJC Madrid
Daniele Panozzo, New York University
Fabio Pellacini, Sapienza University of Rome
Nico Pietroni, CNR-ISTI
Hong Qin, Stony Brook University
Zhong Ren, Zhejiang University
Holly Rushmeier, Yale University
Hubert Shum, Northumbria University
Claudio Silva, New York University
Cyril Soler, Inria
Justin Solomon, MIT
Shinjiro Sueda, Texas A&M
Kalyan Sunkavalli, Adobe
Matthias Teschner, University of Freiburg
Nils Thuerey, TU Munich
James Tompkin, Brown University
Xin Tong, Microsoft Research Asia
Yu-Ting Tsai, Yuan Ze University
Amir Vaxman, Utrecht University
Etienne Vouga, UT Austin
Lvdi Wang, Microsoft Research Asia
Yu-Shuen Wang, National Chiao Tung University
Huamin Wang, Ohio State University
Wenping Wang, The University of Hong Kong
Rui Wang, University of Massachusetts
Sai-Keung Wong, National Chiao Tung University
Tien-Tsin Wong, The Chinese University of Hong Kong
Enhua Wu, Chinese Academy of Sciences & University of Macau
Hongzhi Wu, Zhejiang University
Chris Wyman, NVIDIA Research
Kai Xu, National University of Defense Technology

International Program Committee

External Reviewers

Alliez, Pierre
Ando, Ryoichi
Assarsson, Ulf
Azencot, Omri
Baecher, Moritz
Belcour, Laurent
Bitterli, Benedikt
Bittner, Jiří
Bo, Pengbo
Boll Nielsen, Jannik
Boominathan, Vivek
Bousseau, Adrien
Bowman, Doug
Bryan, Chris
Calian, Dan Andrei
Casas, Dan
Ceylan, Duygu
Chapiro, Alexandre
Chen, Renjie
Chen, Xiaodiao
Chen, Yi-Ling
Chentanez, Nuttapong
Chien, Edward
Chu, James
Cline, David
Crnovrsanin, Tarik
Darabi, Soheil
Du, Peng
Dudte, Levi
Duncan, Noah
Ebeida, Mohamed
Fei, Yun
Feiner, Steven K.
Feng, Jie
Fišer, Jakub
Fratarcangeli, Marco
Frigo, Oriel
Fu, Chi-Wing
Fu, Xiaoming
Gao, Lin
Gao, Xifeng
Garces, Elena
Goes, Fernando de
Goswami, Prashant
Guennebaud, Gael
Guo, Jianwei
Hädrich, Torsten
Harada, Takahiro
He, Ying

Hennessey, James
Hochstetter, Hendrik
Hongyi, Xu
Hormann, Kai
Hou, Junhui
Hoyet, Ludovic
Hu, Xinghong
Hu, Zhe
Hua, Binh-Son
Huang, Jia-Bin
Huang, Jingwei
Hyde, David
Iwasaki, Kei
Jansen, Yvonne
Jarabo, Adrián
Ji, Yu
Jin, Xiaogang
Kalkofen, Denis
Kalojanov, Javor
Kazhdan, Misha
Khademi Kalantari, Nima
Kim, Kujin
Kim, Min H.
Kim, Young J.
Langlois, Tim
Lei, Na
Lepetit, Vincent
Leung, Howard
Li, Chen
Li, Guiqing
Li, Jun
Li, Kun
Li, Xiao
Lin, Chao-Hung
Lin, Haiting
Lin, Hongwei
Lin, Kaimo
Lin, Shih-Syun
Lin, Stephen
Liu, Shuaicheng
Liu, Xueting
Liu, Zhiguang
Livesu, Marco
Lu, Xuequan
Mao, Xiangyu
Mao, Xiaoyang
Martínez, Jonas
McCann, Jim
Merrell, Paul

Moon, Bochang
Mueller, Paul
Nan, Liangliang
Nguyen, Rang
Niu, Yuzhen
Nogneng, Dorian
Okabe, Makoto
Ovsjanikov, Maks
Pan, Hao
Panetta, Julian
Park, Kyoungju
Peers, Pieter
Qiu, Linhai
Renoust, Benjamin
Rhee, Taehyun
Rodola, Emanuele
Roy, Lawrence
Sahillioglu, Yusuf
Sauer, Franz
Seok Heo, Yong
Serrano, Ana
Shao, Tianjia
Sharf, Andrei
Shi, Fuhao
Song, Ying
Su, Hao
Su, Zhengyu
Tagliasacchi, Andrea
Tai, Yu-Wing
Takahashi, Tetsuya
Tam, Gary Kl.
Tanahashi, Yuzuru
Tang, Chengcheng
Tang, Chengzhou
Tarini, Marco
Thanh Nguyen, Duc
Thomaszewski, Bernhard
Wang, Baoyuan
Wang, Beibei
Way, Derlor
Weinmann, Michael
Won, Jungdam
Wu, Chia-Min
Wu, Hsiang-Yun
Xi, Pengcheng
Xin, Tong
Xu, Feng
Xu, Pengfei
Xu, Xu

External Reviewers

Xue, Su	Yeh, I-Cheng	Zhang, Jianjie
Yan, Ling-Qi	You, Shaodi	Zhang, Lei
Yang, Xiaosong	Yu, Hongfeng	Zhang, Xiaoting
Yang, Xubo	Yu, Lap-Fai	Zheng, Yi
Yang, Zhou	Yuan, Ye	Zhong, Zichun
Yao, Chih-Yuan	Zhang, Fang-Lue	Zhou, Qingnan
Ye, Jinwei	Zhang, Guofeng	Zollhoefer, Michael

Author Index

TABLE OF CONTENTS

TABLE OF CONTENTS

Invited Talk

Computer Animation Fuels new Design Engines

Miguel A. Otaduy

Associate professor of Universidad Rey Juan Carlos (URJC Madrid)

Abstract

Design is ubiquitous, and computer graphics has been an integral tool for design since the early days of CAD. The relevance of CAD in computer graphics is experiencing a revival, and computer animation is no exception. Computer animation provides a means to create computer models of objects, bodies, or other phenomena, which can then be used within a CAD application. Beyond movies and video games, computer animation enjoys the opportunity to transform the way in which we approach design. This talk will cover several examples of computer graphics research, where computer animation models, together with optimization tools, build the engine of design applications. The examples cover the animation of diverse materials such as skin, soft tissue, cloth, or flexible fabrication materials, and they find impact in diverse applications such as medicine, fabrication, or fashion.

Short Biography

Miguel Otaduy is a professor at Universidad Rey Juan Carlos, where he leads the Multimodal Simulation Laboratory http://mslab.es. He obtained his PhD in computer science at the University of North Carolina in 2004, and he was a research associate at ETH Zurich from 2005 to 2008, when he joined URJC. His research seeks novel models and algorithms to simulate mechanical phenomena in a wide variety of applications involving dynamic systems. These include medical training and planning, computer animation and videogames, computational design and virtual prototyping, computer haptics or virtual touch, and even molecular dynamics for drug design. He pays special interest to the robust and efficient solution of contact and interaction between different objects, particles, or materials. He aims to develop solutions from different angles, including geometric algorithms, efficient discretizations, numerical methods, directable simulation, the use of precomputed or measured data, massively parallel computing, or user interaction. Miguel Otaduy is currently associate editor for the IEEE Trans. on Visualization and Computer Graphics and the IEEE Robotics & Automation Letters. He has also served as program chair for the ACM SIGGRAPH / Eurographics Symp. on Computer Animation, the ACM SIGGRAPH Symp. on Interactive 3D Graphics & Games, and the IEEE World Haptics Conference.

Invited Talk

Image-based Modeling and Rendering

Johannes Kopf
Research Scientist of Facebook

Abstract

The field of computer vision has long been working on the problem of reconstructing three-dimensional models from two-dimensional images, while the field of computer graphics has been—in a way—working on the opposite problem of rendering compelling two-dimensional images from a given three-dimensional scene description. The two fields are coming together in the area of Image-based Modeling and Rendering (IBMR). These methods perform a purpose-driven reconstruction and re-projection of a set of input images or video with the goal of synthesizing novel views of the same scene or performing other interesting image manipulations. Compared to modeling from scratch, IBMR often has often the advantage of better retaining the photographic quality of the input image set. In addition, the reconstruction is often automatic, which makes the systems suitable for casual users. In this talk I will look at the (more recent) history of this area and present a selection of interesting systems and algorithms, focusing on practical applications. I will also discuss open problems and interesting directions for future research in this area.

Short Biography

Johannes Kopf is a research scientist in the Computational Photography group at Facebook in Seattle. Before joining Facebook, he has been working for Microsoft Research, and even before, he received a PhD from the University of Konstanz, Germany. Johannes has received the Eurographics Young Researcher Award in 2013, and the ACM SIGGRAPH Significant New Researcher Award in 2015 for his contributions to the fields of digital imaging and video. Johannes' work is in the fields of computer graphics and vision. More specifically, his past research spans a variety of areas including computational photography, image-based rendering, image and texture synthesis, and digital imaging and video.

Invited Talk

What is the Next Stage of Augmented Reality

Hirokazu Kato
Professor of Nara Institute of Science and Technology

Abstract

Augmented Reality (AR) has been studied for more than 20 years. Nowadays we can see a lot of AR applications such as PokemonGO. Some people think that AR technologies are almost completed and it has moved to a practical phase. But it is not true because current AR applications are not ideal style of AR. AR researchers still have to make the next breakthrough. In this talk, I would like to introduce my past works on AR and then explain my idea about what AR researchers have to do for the next breakthrough. After that I will briefly talk about my current research works which I am expecting to make the next breakthrough for AR.

Short Biography

Dr. Hirokazu Kato received Dr. Eng. degrees from Osaka University, Japan in 1996. He has worked for Osaka University and Hiroshima City University and since 2007 he has been working for Nara Institute of Science and Technology. Dr. Kato has studied about Augmented Reality for more than 15 years. He developed a vision-based tracking library called the ARToolKit in 1999 which has had a significant impact on the growth of Augmented Reality research. Dr. Kato received Virtual Reality Technical Achievement Award from IEEE VGTC in 2009 and Lasting Impact Award at the 11th IEEE International Symposium on Mixed and Augmented Reality in 2012.