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Editorial

Foreword to the Special Section on Shape Modeling International 2018

Shape Modeling International (SMI) promotes the dissemination of new computational techniques and mathematical theories for modeling, generating, editing, and processing digital shape representations. Launched in 1997 by Prof. Tosyiasu L. Kunii, SMI was initially characterized by tracks on topological methods for shape modeling, functional and implicit representations, as well as interactive shape manipulation techniques. The scientific focus of SMI evolved over time, and emerging topics such as shape matching, fabrication, 3D geometry acquisition, and reconstruction, have been gradually introduced.

The SMI conference has been hosted in several countries around the world, including Italy (2001), Canada (2002), South Korea (2003), Italy (2004), USA (2005), Japan (2006), France (2007), USA (2008), China (2009), France (2010), Israel (2011), USA (2012), UK (2013), Hong Kong (2014), France (2015), Germany (2016), and USA (2017). This year, SMI 2018 was hosted in Lisbon, Portugal.

SMI has a tradition in seeking co-location with other conferences: in 2004, it was organized for the first time with SPM (the ACM Symposium on Solid and Physical Modeling), whereas in 2016 it was held in conjunction with both SPM and SGP (the Symposium on Geometry Processing) as part of the first International Geometry Summit (IGS). This year, SMI was co-located with the Fabrication and Sculpting Event (FASE 2018), which originated with SMI several years ago and is now featured as an independent session within the venue.

The individual technical papers track for SMI 2018 received a total of 45 complete paper submissions, and 15 have been accepted as full papers for publication in this special issue devoted to the proceedings of SMI. Each paper received five reviews from members of the program committee and underwent a two-stage review process. In addition, 4 papers published in a regular issue of *Computers and Graphics (C&G)*, along with 3 more papers published in a regular issue of *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, which were not presented at any conference before, were invited to be part of the SMI 2018 technical program. In total, 22 papers were orally presented at the conference grouped into themed sessions as follows:

Session 1—shape design

- Rapidly contracting subdivision yields finite, effectively C^2 surfaces. By Kestutis Karciauskas and Jörg Peters [1].
- Multi-sided Bézier surfaces over concave polygonal domains. By Péter Salvi and Tamás Várady [2].
- 3D synthesis of man-made objects based on fine-grained parts. By Diego Gonzalez and Oliver van Kaick [3].

Session 2–surface parametrization and simplification

- Sphere-based cut construction for planar parameterizations. By Shuangming Chai, Xiao-Ming Fu, Xin Hu, Yang Yang and Ligang Liu [4].
- Joint planar parameterization of segmented parts and cage deformation for dense correspondence. By Srinivasan Ramachandran, Donya Ghafourzadeh, Martin de Lasa, Tiberiu Popa and Eric Paquette [5].
- Edge contraction in persistence-generated discrete Morse vector fields. By Tamal Dey and Ryan Slechta [6].

Session 3–2D/2.5D shape processing

- 2D skeleton extraction based on heat equation. By Fengyi Gao, Guangshun Wei, Shiqing Xin, Shanshan Gao and Yuanfeng Zhou [7].
- Hierarchical representation for rasterized planar face complexes. By Guillaume Damiand, Aldo Gonzalez-Lorenzo, Jarek Rossignac and Florent Dupont [8].
- A Delaunay triangulation based approach for cleaning rough sketches. By Amal Dev Parakkat, Uday Bondi Pundarikaksha and Ramanathan Muthuganapathy [9].
- Robust enhancement of depth images from depth sensors. By Tariqul Islam, Christian Scheel, Renato Pajarola and Oliver Staadt. (C&G paper invited for presentation at SMI) [10].

Session 4–reconstruction I

- Peeling the longest: A simple generalized curve reconstruction algorithm. By Amal Dev Parakkat, Subhasree Methirumangalath and Ramanathan Muthuganapathy [11].
- Texturing and inpainting a complete tubular 3D object reconstructed from partial views. By Julien Fayer, Bastien Durix, Simone Gasparini and Géraldine Morin [12].
- Efficient tree modeling from airborne LiDAR point clouds. By Shaojun Hu, Zhengrong Li, Zhiyi Zhang, Dongjian He and Michael Wimmer. (C&G paper invited for presentation at SMI) [13].

Session 5–denoising

- Mesh denoising with (geo)metric fidelity. By Marco Centin and Alberto Signoroni. (TVCG paper invited for presentation at SMI) [14].

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- Constraint-based point set denoising using normal voting tensor and restricted quadratic error metrics. By Sunil Kumar Yadav, Ulrich Reitebuch, Martin Skrodzki, Eric Zimmermann and Konrad Polthier [15].
- Propagated mesh normal filtering. By Bin Liu, Junjie Cao, Weiming Wang, Ning Ma, Bo Li, Ligang Liu and Xiuping Liu [16].

Session 6–shape matching and interpolation

- Embedding shapes with Green's functions for global shape matching. By Oliver Burghard, Alexander Dieckmann and Reinhard Klein. (C&G paper invited for presentation at SMI) [17].
- Deep style estimator for 3D indoor object collection organization and scene synthesis. By Xiaotian Wang, Bin Zhou, Yu Zhang and Yifan Zhao [18].
- DiLight: digital light table - Inbetweening for 2D animations using guidelines. By Leonardo Carvalho, Ricardo Marroquim and Emilio Vital Brazil. (C&G paper invited for presentation at SMI) [19].

Session 7–reconstruction II

- MixedFusion: Real-time reconstruction of an indoor scene with dynamic objects. By Hao Zhang and Feng Xu. (TVCG paper invited for presentation at SMI) [20].
- Surface reconstruction of incomplete datasets: a novel Poisson surface approach based on CSRBF. By Jules Morel, Alexandra Bac and Cédric Véga [21].
- Robust non-rigid motion tracking and surface reconstruction using L_0 regularization. By Kaiwen Guo, Feng Xu, Yangang Wang, Yebin Liu and Qionghai Dai. (TVCG paper invited for presentation at SMI) [22].

Two outstanding keynote speakers further enriched the SMI 2018 program: Hao Zhang (Professor at Simon Fraser University, Canada) gave a talk with title "Symmetry to Functionality: An Evolution to Understand and Model 3D Shapes", whereas Baining Guo (Deputy Managing Director and Distinguished Scientist at Microsoft Research Asia) offered a historic perspective on shape representations.

SMI keeps on featuring the Replicability Stamp award, first introduced in 2016. This award is an additional recognition for authors of accepted papers who provide a complete open-source implementation of their algorithm that can be used to reproduce the results presented in every figure and table shown in their paper.

SMI'18 is held "in-cooperation" with ACM/SIGGRAPH and Eurographics and received financial sponsorship from Disney Research, Adobe Systems Inc., CGD Financial Group, Foundation of Science and Technology (FCT) in Portugal, and Elsevier. The SMI 2018 program chairs wish to acknowledge all the persons who contributed to the successful organization of the program, particularly to Madalena Almeida (Abreu PCO). We also acknowledge the help of the SMI steering committee and the continuous support of Joaquim Jorge, editor-in-chief of *Computers and Graphics*, and all the Elsevier team. We would also like to thank all the members of the international program committee as well as the replicability stamp committee for their work.

SMI 2018 program committee

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Evangelos Kalogerakis is an assistant professor in computer science at the University of Massachusetts Amherst. His research deals with the development of computational techniques that intelligently analyze and synthesize visual content. He is particularly interested in developing machine learning algorithms that help people to easily create and process 3D models of objects and animations. He obtained his PhD from the University of Toronto in 2010. He was a postdoctoral researcher at Stanford University from 2010 to 2012. His research is supported by NSF awards, Adobe and NVidia. He received the NSERC Alexander Graham fellowship and the international EPFL Dimitris N. Chorafas award for his PhD work. He has served on several technical paper committees for Siggraph ASIA, Eurographics, SGP, and SMI.

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