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Editorial

Foreword to the Special Issue on Shape Modeling International 2017

Shape Modeling International (SMI) promotes the dissemination of new mathematical theories and novel computational techniques for modeling, simulating, and processing digital shape representations. Launched in 1997 by Prof. Tosyiasu L. Kunii, this year SMI is in its 20th anniversary, and proudly gathers a wide community of researchers, developers, practitioners, and students in academia and industry from all over the world. In the realm of Computer Graphics conferences, SMI is characterized by its particular focus on methods and techniques to model, design and analyze shapes in all their aspects. The scientific focus of SMI evolved over time, and emerging topics such as shape semantics, shape similarity and fabrication have been gradually introduced.

Starting from 2001, the SMI conference became an annual event with the venue rotating in turn among Asia, Europe and America: 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).

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). In line with this tradition, SMI 2017 will be once again co-located with SPM as part of the International Convention on Shape, Solid, Structure, & Physical Modeling (S3PM-2017) in Berkeley, California.

The individual technical papers track for SMI'17 received a total of 49 complete paper submissions, and 18 have been accepted as full papers for publication in this special issue devoted to the proceedings of SMI. Each paper received three or more reviews from members of the program committee and underwent a two-stage review process. An additional paper, which was previously published in a regular issue of *Computers and Graphics* but was never presented at a conference, was invited to be part of SMI'17 technical program, so that a total of 19 papers were orally presented at the conference grouped into themed sessions as follows:

Session 1—Reconstruction

- Patterns from photograph: Reverse-engineering developable products. By Amélie Fondevilla, Adrien Bousseau, Damien Rohmer, Stefanie Hahmann, and Marie-Paule Canin [1]
- Accurate 3D face reconstruction via prior constrained structure from motion. By Matthias Thomas Hernandez, Jongmoo Choi, Tal Hassner, and Gerard Medioni [2]
- Extraction of tubular shapes from dense point clouds and application to tree reconstruction from laser scanned data. By Joris Ravaglia, Alexandra Bac, and Richard A Fournier [3]

Session 2–Visibility and maps

- On the visibility locations for continuous curves. By Sarang Joshi, Yoshida Rao, Bharath Ram Sundar, and Ramanathan Muthuganapathy [4]
- On visibility & empty-region graphs. By Sagi Katz and Ayellet Tal [5]
- Fast mapping and morphing for genus-zero meshes with cross spherical parameterization. By Chao Peng and Sabin Timalsena (C&G paper invited for presentation at SMI) [6]

Session 3–Interactive modeling

- Height field construction using cross contours. By Tuan M Bui, Junho Kim, and Yunjin Lee [7]
- Interactive modeling of smooth manifold meshes with arbitrary topology: G1 stitched Bi-cubic Bezier patches. By Ergun Akleman, Vinod Srinivasan, and Jianer Chen [8]
- Shape from sensors: Curve networks on surfaces from 3D orientations. By Tibor Stanko, Stefanie Hahmann, Georges-Pierre Bonneau, and Nathalie Saguin-Sprynski [9]

Session 4–Fabrication with lines and panels

- Line drawing for 3D printing. By Zhonggui Chen, Zifu Shen, Jianzhi Guo, Cao Juan, and Xiaoming Zeng [10]
- Interlocked Archimedean spirals for conversion of planar rigid panels into locally flexible panels with stiffness control. By Saeid Zarrinmehr, Ergun Akleman, Mahmood Ettehad, Negar Kalantar, Alireza Borhani, and Shinjiro Sueda [11]

Session 5–Shape analysis

- A multi-view recurrent neural network for 3D mesh segmentation. By Truc Le, Giang Bui, and Ye Duan [12]
- Hierarchical Forman triangulation: A multiscale model for scalar field analysis. By Federico Iuricich and Leila De Floriani [13]
- Hole detection of a planar point set: An empty disk approach. By Subhasree Methirumangalath, Shyam Sundar Kannan, Amal Dev Parakkat, and Ramanathan Muthuganapathy [14]

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Session 6–Meshes and trusses for fabrication

- Unsharp masking geometry improves 3D prints. By Philipp Herholz, Sebastian Koch, Tamy Boubekeur, and Marc Alexa [15]
- Epsilon-maps: characterizing, detecting and thickening thin features in geometric models. By Daniela Cabiddu and Marco Attene [16]
- Support-free frame structures. By Weiming Wang, Sicheng Qian, Liping Lin, Baojun Li, Bocai Yin, Ligang Liu, and Xiuping Liu [17]

Session 7–Spatial subdivisions

- Parallel quadtree construction on collections of objects. By Nathan Morrical and John Edwards [18]
- A novel interpolation scheme for dual marching cubes on octree volume fraction data. By Kim Seungki, Yutaka Ohtake, Yukie Nagai, and Hiromasa Suzuki [19].

Two outstanding keynote speakers further enriched SMI'17 program: Hao Li (CEO of Pinscreen & Professor at USC) gave a talk on Digital human teleportation using deep learning, whereas Jonathan R. Shewchuk (Professor at UC Berkeley) illustrated the underlying theory and potential applications of Restricted constrained delaunay triangulations.

In addition, S3PM 2017 will also host the Fabrication and Sculpting Event (FASE), which originated with SMI several years ago and is now featured as an independent component of the convention. Shape Modeling International 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 the paper. We congratulate the authors of the following paper for receiving the Replicability Stamp:

Hole detection of a planar point set: An empty disk approach: Subhasree Methirumangalath, Shyam Sundar Kannan, Amal Dev Parakkat, and Ramanathan Muthuganapathy [14]

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SMI 2017 program committee

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Sylvain Lefebvre is a senior researcher at Inria (France). After a PhD at Grenoble Alpes University (2002–2004), he joined Microsoft Research as a postdoctoral researcher in 2005 and Inria in 2006. His main research focus is to simplify content creation, synthesizing highly detailed patterns, structures and shapes, with applications in computer graphics and additive manufacturing. Sylvain received the EUROGRAPHICS Young Researcher Award in 2010 for his work on texturing data structures and runtime procedural texture synthesis. Since 2012, he is the principal investigator of the ERC ShapeForge project, which focuses on shape synthesis for additive manufacturing. He created and is the main developer of the IceSL software for modeling for additive manufacturing. Sylvain is an active member of the community and serves on the technical papers committee and editorial boards of the main conferences and journals of the field.

Daniele Panozzo is an assistant professor of computer science at the Courant Institute of Mathematical Sciences in New York University. Prior to joining NYU he was a postdoctoral researcher at ETH Zurich (2012–2015). He earned his PhD in computer science from the University of Genova (2012) and his doctoral thesis received the EUROGRAPHICS Award for Best PhD Thesis (2013). Daniele's research interests are in digital fabrication, geometry processing, architectural geometry and discrete differential geometry. He received the EUROGRAPHICS Young Researcher Award in 2015, the NSF CAREER Award in 2017, and his work has been covered by Swiss National Television and various national and international printed media. Daniele is leading the development of libigl, an award-winning (EUROGRAPHICS Symposium of Geometry Processing Software Award, 2015) open-source geometry processing library that supports academic and industrial research and practice. Daniele is chairing the Graphics Replicability Stamp (http://www.replicabilitystamp.org), which is an initiative to promote reproducibility of research results and to allow scientists and practitioners to immediately benefit from state-of-the-art research results.

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