

International Geometry Summit 2016

June 20–24, 2016, Berlin

www.geometrysummit.org

Invited Lectures

Tim Davis, Texas A&M / Martin Rumpf, Universität Bonn / Henry Segerman, Oklahoma State University / Bézier Award Lecture

Summerschool June 18–19, 2016, Berlin

Public Lectures June 21, 2016, Urania–Berlin

Cristina Ceccato, Zaha Hadid Architects / Rinus Roelofs, www.rinusroelofs.nl / Henry Segerman, Oklahoma State University

SGP | SMI | SPM

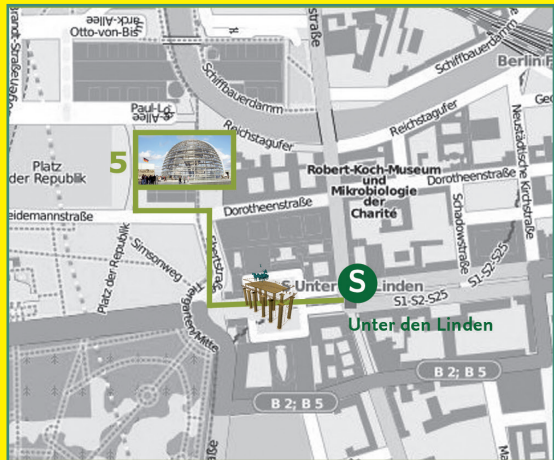
The International Geometry Summit 2016 (IGS) is a joint event and co-location of the major conferences in applied geometry: Symposium on Geometry Processing (SGP) / Shape Modeling International (SMI) / Solid and Physical Modeling (SPM)

For the first time, the prominent international conferences SGP, SMI and SPM will join forces and showcase the breadth and impact of applied geometry. The summit will combine the presentations from all three conferences as well as the perspectives of renowned invited speakers into one coherent program:

Summit Chairs: Marc Alexa (TU Berlin) / Konrad Polthier (FU Berlin)
Summit Committee: Marc Alexa (TU Berlin) / Michael Floater (U Oslo) / Leif Kobbelt (RWTH Aachen) / Konrad Polthier (FU Berlin) / Jarek Rossignac (Georgia Tech) / Michela Spagnuolo (CNR) / Wenping Wang (HKU)
SGP Chairs: Leif Kobbelt (RWTH Aachen) / Maks Dvjanikov (Ecole Polytechnique) / Daniele Panozzo (NYU)
SMI Chairs: Marc Alexa (TU Berlin) / Keenan Crane (CMU) / Michela Spagnuolo (CNR)
SPM Chairs: Maria Botsch (U Bielefeld) / Stefanie Hahmann (INRIA

Grenoble) / Konrad Polthier (FU Berlin) / Scott Schaefer (Texas A&M)
FASE Choirs: Ergun Akleman (Texas A&M) / Jakob Andreas Barentzen (OTU) / Konrad Polthier (FU Berlin)
Summer School Chairs: Klaus Hildebrandt (TU Beif) / Etienne Vouga (UT Austin)
Reproducibility Choirs: Daniele Panozzo (NYU) / Maks Dvjanikov (Ecole Polytechnique) / Marco Attene (MATI-BE/CNR) / Maria Botsch (U Bielefeld)





1 | Conference

Seminaris CampusHotel Berlin, Takustraße 39, 14195 Berlin, Tel.: +49 (30) 557797-0

2 | Welcome Reception

Freie Universität Berlin, Institut für Mathematik, Annim-allee 6, 14195 Berlin, Tel.: +49 (30) 838 75866

3 | Metro-Station U3 Dahlem-Dorf

4 | Bus-Station X83

5 | Conference Dinner

Käfer Dachgarten-Restaurant, Reichstag, Platz der Republik, 11011 Berlin

Identity card required

Take bus X83 from the bus-station 4 to Rathaus Steglitz and then S-Bahn S1 to Unter den Linden (direction Oranienburg). Pass through the Brandenburg Gate, turn right to the Reichstag 5. Entrance to the restaurant is to the right of the big outside staircase.



Urania | Public Lectures

Urania-Berlin, An der Urania 17, 10787 Berlin

WLAN | Wireless access is available either by an EDUROAM account or by a direct WLAN connection:

SSID: conference | Key: 33z6uuzt

Monday, June 20

08:30 – 09:00 Registration
09:00 – 09:30 Opening Ceremony
09:30 – 10:30 Invited Lecture I *Chair: Scott Schaefer*

Martin Rumpf, Universität Bonn Geometry Processing in Shape Spaces

10:30 – 11:00 Coffee Break

11:00 – 12:30 SGP *Parametrization and Volumes I Chair: David Bommes*
SPM 11:00 – 12:30 *Collisions and CAD I Chair: Vadim Shapiro*

Scale-Invariant Directional Alignment of Surface Parametrizations Marcel Campen, Moritz Ibing, Hans-Christian Ebke, Denis Zorin and Leif Kobbelt

Polycube Simplification for Coarse Layouts of Surfaces and Volumes Gianmarco Cherchi, Marco Livesu and Riccardo Scateni

Incorporating Sharp Features in the General Solid Sweep Framework Bharat Adsul, Jinesh Machchhar and Milind Sohoni

Direct Simulation for CAD Models undergoing Parametric Modifications Liangchao Zhu, Ming Li and Ralph Martin

Continuous Penetration Depth Computation for Rigid Models using Dynamic Minkowski Sums Youngeun Lee, Evan Behar, Jyh-Ming Lien and Young J. Kim

Tool Path Generation for Chamfering Drill Holes of a Pipe with Constant Width Takato Sato, Youichi Sato and Takashi Maekawa

12:30 – 14:00 Lunch Break

14:00 – 15:30 SGP *Mapping I Chair: Justin Solomon*
SPM 14:00 – 15:45 *The Physical World I Chair: Charlie C. L. Wang*

Iterative Closest Conformal Maps between Planar Domains Aviv Segall and Mirela Ben-Chen

Complex Transfinite Barycentric Mappings with Similarity Kernels Renjie Chen and Craig Gotsman

Advection-Based Function Matching on Surfaces Omri Azencot, Orestis Vantzos and Mirela Ben-Chen

Homogenization of Material Properties in Additively Manufactured Structures Xingchen Liu and Vadim Shapiro

Efficient Wave-Based Acoustic Material Design Optimization Nicolas Morales and Dinesh Manocha

Modeling and Analysis of Origami Structures with Smooth Folds Edwin Peraza Hernandez, Darren Hartl, Ergun Akleman and Dimitris Lagoudas

A Multi-frame Graph Matching Algorithm for Low-bandwidth RGB-D SLAM Shuai Zheng, Jun Hong, Kang Zhang, Baotong Li and Xin Li



15:30 / 15:45 – 16:00 Coffee Break

16:00 – 17:30 FASE I *Chairs: Ergun Akleman & Jakob Andreas Barentzen*

Constructing Porous Geometry Gershon Elber
An Exploration on Transformable Shading Systems Jenny Zhou and Negar Kalantar

Fabricate 2.5D Shadow Art Sculpture Yunjoo Park and Jyh-Ming Lien

Sole Maker: Towards Ultra-personalised Shoe Design Using Voronoi Diagrams and 3D Printing Loe Feijs, Troy Nachtigall and Oscar Tomico

Rib Cage Recreation: Towards Realistic Neonatal Manikin Construction using MRI Scanning and 3D Printing Mark Thielen and Frank Delbressine

18:00 - 21:00 Welcome Reception
FU Berlin, Institute of Mathematics

Tuesday, June 21

08:30 – 09:00 Registration

09:00 – 10:30 SGP
Fitting and Tracking | Chair: Michael BronsteinSPM 09:00 – 10:30
Computational & Differential Geometry | Gershon Elber**Near-Isometric Level Set Tracking** Michael Tao, Justin Solomon and Adrian Butscher**Mobility Fitting using 4D RANSAC** Hao Li, Guowei Wan, Honghua Li, Andrei Sharf, Kai Xu and Baoquan Chen**Relative Scale Estimation and 3D Registration of Multi-Modal Geometry using Growing Least Squares** Nicolas Mellado, Matteo Dellepiane and Roberto Scopigno**Comparison of Discrete Hodge Star Operators for Surfaces** Mamdouh Mohamed, Anil Hirani and Ravi Samtaney**Boundary-Aware Hodge Decompositions for Piecewise Constant Vector Fields** Konstantin Poelke and Konrad Polthier**Nearly Convex Segmentation of Polyhedra Through Convex Ridge Separation** Jyh-Ming Lien, Guilin Liu and Zhonghua Xi

10:30 – 11:00 Coffee Break

11:00 – 12:30 SGP
Modeling and Design | Chair: Alec JacobsonSPM 11:00 – 12:30
Surface Reconstruction & Visualization | Jyh-Ming Lien**CustomCut: On-demand Extraction of Customized 3D Parts with 2D Sketches** Xuekun Guo, Juncong Lin, Kai Xu, Siddhartha Chaudhuri and Xiaogang Jin**Stenciling: Designing Structurally-Sound Surfaces with Decorative Patterns** Christian Schumacher, Bernhard Thomaszewski and Markus Gross**Splines in the Space of Shells** Behrend Heeren, Martin Rumpf, Peter Schröder, Max Wardetzky and Benedikt Wirth**A Closed-Form Formulation of HRBF-Based Surface Reconstruction by Approximate Solution** Shengjun Liu, Charlie Wang, Guido Brunnett and Jun Wang**Compact Implicit Surface Reconstruction via Low-rank Tensor Approximation** Maodong Pan, Weihua Tong and Falai Chen**eBits: Compact Stream of Mesh Refinements for Remote Visualization** Mukul Sati, Peter Lindstrom and Jarek Rossignac

12:30 – 14:00 Lunch Break

14:00 – 15:30 SGP
Functional Correspondence | Chair: Mirela Ben-ChenSPM 14:00 – 15:30
Parameterization and Classification | Klaus Hildebrandt**Stable Region Correspondences Between Non-Isometric Shapes** Vignesh Ganapathi-Subramanian, Boris Thibert, Maks Ovsjanikov and Leonidas Guibas**Partial Functional Correspondence** Emanuele Rodolà, Luca Cosmo, Michael M. Bronstein, Andrea Torsello and Daniel Cremers**Non-Rigid Puzzles** Or Litany, Emanuele Rodolà, Alex Bronstein, Michael Bronstein and Daniel Cremers**Surface Approximation via Sparse Representation and Parameterization Optimization** Linlin Xu, Ruimin Wang, Zhouwang Yang, Jiansong Deng, Falai Chen and Ligang Liu**Measure Controllable Volumetric Mesh Parameterization** Kehua Su, Wei Chen, Na Lei, Li Cui, Jian Jiang and Xianfeng Gu -- Edward Chien**3D Model Classification via Principal Thickness Images** Zhenyu Shu, Shiqing Xin, Huixia Xu, Ladislav Kavan, Pengfei Wang and Ligang Liu

15:30 – 17:00 SPM & FASE Poster Presentations

Chopper++: Interactive Stress-Aware Partition for Large Model Fabrication Chenming Wu, Aamir Khan Jadoon, Yong-Jin Liu, Ying He and Charlie C. L. Wang**Modeling Deformable Objects using Local Rigid Body Simulation** Lifeng Zhu and Yin Yang**Designing with Euler Elastica** Ann-Sofie Fisker, David Brander, Jens Gravesen and Jakob Andreas Bærentzen**Segmenting a Surface Mesh into Parts using Morse Theory** Mustafa Hajji, Tamal Dey and Xin Li

Tuesday, June 21

15:30 – 17:00 SPM & FASE Poster Presentations

Efficient Bi-Scale Design of Semi-Regular Porous Structures with Desired Deformation Behaviour
Chao Xu, Ming Li, Jin Huang and Shuming Gao

Integrative Analysis on Optimal Build-Orientation of 3D-Objects for FDM Jeong-Taek Oh, Ju-sung Lee, Jeonghun Lim and Kunwoo Lee

Closed Curve Blending based on Curvature Flow
Masahiro Hirano, Yoshihiro Watanabe and Masatoshi Ishikawa

Optimal Approximation of Conic Sections by Cubic Polynomial Curves Xuli Han and Xiao Guo

Design of Origami Structures with Smooth Folds
Edwin Hernandez, Darren Hartl and Dimitris Lagoudas

The Relation between Sound and Music Explored through Animation and 3D Printing Marinthe de Bokx and Oleg Fryazinov

The Menger Sponge – A First Exploration into 3D Generated Form Richard Kennedy

17:30 – 18:30 Transfer to Urania-Berlin

19:00 – 22:00 Public Lectures | *Chairs: Marc Alexa & Konrad Polthier*
Urania-Berlin, An der Urania 17, 10787 Berlin

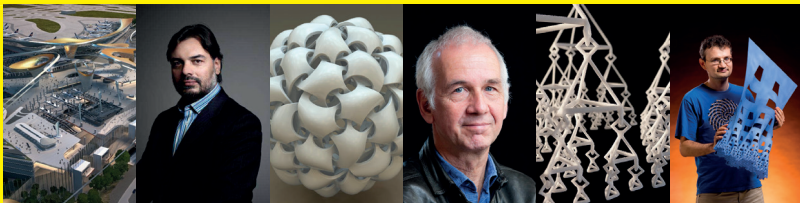
Cristiano Ceccato, Associate Director, Zaha Hadid Architects
On the Convergence of Systemic Thinking and Digital Practice

Rinus Roelofs, Sculptor, www.rinusroelofs.nl
Entwined Surfaces – Multilayer Structures Inspired by
Leonardo da Vinci's Elevation Concept

Henry Segerman, PhD, Oklahoma State University
Design of 3D Printed Mathematical Art

International Geometry Summit 2016

Public Lectures June 21, 2016, Urania-Berlin



Wednesday, June 22

08:30 – 09:00 Registration
09:00 – 10:30 Bézier Award & Lecture | *Chair: Pere Brunet*

10:30 – 11:00 Coffee Break

11:00 – 12:30 SGP
Fabrication | *Chair: Etienne Vouga*

SMI 11:00 – 12:30
Surfaces | *Chair: Alexander Pasko*

Interactive Modeling of Mechanical Objects Francisca Gil Ureta, Chelsea Tymms and Denis Zorin

A System for High-Resolution Topology Optimization Jun Wu, Christian Dick and Rüdiger Westermann

Data-Driven Bending Elasticity Control by Shell Thickness Xiaoting Zhang, Xinyi Le, Zihao Wu, Emily Whiting and Charlie C. L. Wang

Extrinsically Smooth Direction Fields Zhiyang Huang and Tao Ju

Bijective Spherical Parameterization with Low Distortion Chunxue Wang, Xin Hu, Xiaoming Fu and Li-gang Liu

Construction with Physical Version of Quad-Edge Data Structures Ergun Akleman, Shenyao Ke, You Wu, AliReza Borhani, Negar Kalantar and Jianren Chen



12:30 – 14:00 Lunch Break

14:00 – 15:30 SPM
Splines | *Chair: Elaine Cohen*

SMI 14:00 – 15:30
Reconstruction & Location | *Chair: Michael Kazhdan*

A B-spline based Framework for Volumetric Object Modeling Fady Massarwa and Gershon Elber

Curvature Continuous bi-4 Constructions for Scaffold- and Sphere-like Surfaces Kestutis Karciauskas and Jörg Peters

Integration of Generalized B-spline Functions on Catmull-Clark Surfaces at Singularities Anna Wawrzinek and Konrad Polthier

Template-based Surface Reconstruction from Cross-sections Michelle Holloway, Cindy Grimm and Tao Ju

PinMesh -- Fast and Exact 3D Point Location Queries using a Uniform Grid Salles Viana Gomes de Magalhaes, Marcus Vinicius Alvim Andrade, W. Randolph Franklin and Wenli Li

Color-Aware Surface Registration Zhi-Quan Cheng, Yukun Lai, Ralph Martin, Shiyao Jin and Shuai Lin



15:30 – 16:00 Coffee Break

16:00 – 17:00 SMA Business Meeting and Presentation of the Solid Modeling Pioneer Awards

17:30 – 18:30 Transfer to Käfer Dachgarten-Restaurant

19:00 – 22:00 **Conference Dinner**
Käfer Dachgarten-Restaurant
Identity card required






Thursday, June 23

09:00 – 09:30 Registration
09:30 – 10:30 Invited Lecture | Chair: *Maks Ovsjanikov*

Tim Davis (Texas A&M University) Sparse Matrix Algorithms: Combinatorics + Numerical Methods + Applications = SuiteSparse

10:30 – 11:00 Coffee Break

11:00 – 12:30 SGP
Reconstruction | Chair: *Misha Kazhdan*
SMI 11:00 – 12:30
Splines & Subdivision | Chair: *Stefanie Hahmann*

-  **Curve Reconstruction with Many Fewer Samples** Stefan Ohrhallinger, Scott Mitchell and Michael Wimmer
-  **Crawl through Neighbors: A Simple Curve Reconstruction Algorithm** Amal Dev Parakkat and Ramathan Muthuganapathy
-  **Construction of Topologically Correct and Manifold Isosurfaces** Roberto Grosso
- B-Spline Surface Fitting with Knot Position Optimization** Cao Juan, *Yuhua Zhang*, Zhonggui Chen, Xin Li and Xiaoming Zeng
- Refinable Polycube G-Splines** *Jörg Peters* and Martin Sarov
- Procedural Mesh Features applied to Subdivision Surfaces using Graph Grammars** *Wolfgang Thaller*, Ursula Augsdörfer and Dieter W. Fellner


12:30 – 14:00 Lunch Break

14:00 – 15:30 SGP
Structures | Chair: *Leonidas Guibas*
SMI 14:00 – 15:30
Volumes | Chair: *Pierre Alliez*

- Learning 3D Scene Synthesis from Annotated RGB-D Images** Zeinab Sadeghipour Kermani, Zicheng Liao, Ping Tan and Hao (Richard) Zhang
- Shape Interior Modeling and Mass Property Optimization Using Ray-reps** Jun Wu, *Lou Kramer* and Rüdiger Westermann
- Identifying Style of 3D Shapes using Deep Metric Learning** Isaak Lim, Anne Gehre and Leif Kobbelt
- A 3D+t Laplace Operator for Temporal Mesh Sequences** Stefanie Wuhrer, Victoria Fernández Abrevaya, Sandeep Manandhar and *Franck Hétroy-Wheeler*
- Symmetry and Orbit Detection via Lie-Algebra Voting** Zeyun Shi, Pierre Alliez, Mathieu Desbrun, Hujun Bao and Jin Huang
- Multi-Material Adaptive Volume Remesher** *Noura Faraj*, Jean-Marc Thiery and Tamy Boubekeur

15:30 – 16:00 Coffee Break

16:00 – 17:30 SGP
Voronoi et al. | Chair: *Pierre Alliez*
SMI 16:00 – 17:45
Interactive Modeling | Chair: *Gershon Elber*

-  **Planar Minimization Diagrams via Subdivision with Applications to Anisotropic Voronoi Diagrams** Huck Bennet, Evanthis Papadopoulou and Chee Yap
- Optimized Subspace for Deformation-Based Modeling and Shape Interpolation** *Philipp von Radzewsky*, Elmar Eisemann, Hans-Peter Seidel and Klaus Hildebrandt
- Exploration of Empty Space among Spherical Obstacles via Additively Weighted Voronoi Diagram** Martin Manak
- Modeling Interactive Furniture from a Single Image** Xiaowu Chen, Bo Gao, Dongqing Zou and *Jianwei Li*
- Disk Density Tuning of a Maximal Random Packing** Mohamed Ebeida, Ahmad Rushdi, Muhammad Awad, Ahmed Mahmoud, Dong-Ming Yan, Shawn English, John Owens, Chandrajit Bajaj and Scott Mitchell
- Temporally Coherent Sculpture of Composite Objects** *Artur Pereira Sampaio*, Raphaëlle Chain, Creto A. Vidal and Joaquim B. Cavalcante-Neto
- Tangible 3D Modeling of Coherent and Themed Structures** *Jeppe Ullé Walther*, Andreas Bærentzen and Henrik Aanæs

Friday, June 24

09:00 – 09:30 Registration
09:30 – 10:30 Invited Lecture I *Chair: Michela Spagnuolo*

Henry Segerman, Oklahoma State University
Two Tales of Mathematical Virtual Reality

10:30 – 11:00 Coffee Break

11:00 – 12:30 SMI Segmentation I *Chair: Marco Attene*

Learning to Segment and Unfold Polyhedral Mesh from Failures [Jyh-Ming Lien](#), Yun-Hyeong Kim, Young J. Kim and Zhonghua Xi

The 2D Shape Structure Dataset: A user annotated open Access Database [Axel Carlier](#), Kathryn Leonard, Stefanie Hahmann, Geraldine Morin and Misha Collins



Computing a Discrete Morse Gradient From a Watershed Decomposition Federico Iuricich, Lidija Comic, Leila de Floriani and [Paolo Magillo](#)

12:30 – 14:00 Lunch Break

14:00 – 15:30 SGP Differential Properties I *Chair: Klaus Hildebrandt*

Mesh Statistics for Robust Curvature Estimation Libor Váša, Petr Vanecek, Martin Prantl, Vera Skorkovská, Petr Martinek and Ivana Kolingerová

Towards Globally Optimal Normal Orientations for Large Point Clouds Nico Schertler, Bogdan Savchynsky and Stefan Gumhold

Deep Learning for Robust Normal Estimation in Unstructured Point Clouds Alexandre Boulch and Renaud Marlet

15:30 – 16:00 Awards Ceremony
16:00 – 16:30 Thank you & Outlook

