SIAM/GD 19 PROGRAM

[JRS = Joseph & Rosalie Segal Centre]

Monday, June 17

8:30 - 9:00 Registration at Harbour Center Concourse

9:00 - 10:00 (GD-KN)

SIAMGD Keynote #1 in JRS 1420-1430

Chair: *Kai Hormann, Università della Svizzera Italiana, Lugano, Switzerland.*

Yongjie Jessica Zhang, Carnegie Mellon University, U.S.A.

A Practical Unstructured Spline Modeling Platform for Isogeometric Analysis Applications.

10:00 - 10:20

Coffee break at Harbour Center Concourse

10:20 - 11:20 (GD-KN)

SIAMGD Keynote #2 in JRS 1420-1430

Chair: *Carolina Beccari, University of Bologna, Italy.*

Michael Bronstein, Università della Svizzera Italiana, Switzerland, Imperial College London, United Kingdom and Intel Perceptual Computing, Israel.

How to hear shape, style, and correspondence of 3D shapes - debunking some myths of spectral geometry.

12:00 - 13:30 Lunch on site

13:30 - 14:50 (GD-CP)

SIAMGD CP Session #1 in JRS Centre 1420

Chair: *Yongjie Jessica Zhang, Carnagie Mellon University, U.S.*

[13:30-13:50] Jagdish Krishnaswamy*, Wilfrid Laurier University, Canada, Federico C. Buroni, University of Seville, Spain, Felipe Garcia-Sanchez, University of Malaga, Spain, Roderick Melnik, Wilfrid Laurier University, Canada, Luis Rodriguez-Tembleque, University of Seville, Spain, Andres Saez, University of Seville, Spain.

Geometrical design of new auxetic 3D printable piezoelectric composite materials.

[13:50-14:10] Martin Skrodzki*, Freie Universität Berlin, Germany, Ulrich Reitebuch, Freie Universität Berlin, Germany, Konrad Polthier, Freie Universität Berlin, Germany.

Parallelized Neighbor Search with the Neighborhood Grid: A Computational Geometry Viewpoint.

[14:10-14:30] Falai Chen*, University of Science and Technology of China, Maodong Pan, University of Science and Technology of China.

Volumetric Spline Parameterization for Isogeometric Analysis.

[14:30-14:50] Luke Engvall*, Coreform LLC, USA, Steven Schmidt, Brigham Young University, USA, Derek Thomas, Coreform LLC, USA, Michael Scott, Coreform LLC, USA.

Introduction to unstructured splines (U-splines) for use in computer-aided geometric design software.

SIAMGD CP Session #2 in JRS Centre 1430

Chair: *Ligang Liu, University of Science and Technology of China, China.*

[13:30-13:50] Haohao Wang*, Southeast Missouri State University, USA, Ron Goldman, Rice University, USA.

Dual Quaternion Surfaces.

[13:50-14:10] Laureano Gonzalez-Vega*, Universidad de Cantabria, Spain, Jorge Caravantes, Universidad de Alcala, Spain.

On the interference problem for ellipsoids: new closed form solutions.

[14:10-14:30] Leonardo Fernández Jambrina*, Universidad Politécnica de Madrid, Spain, Alicia Cantón, Universidad Politécnica de Madrid, Spain, Eugenia Rosado María, Universidad Politécnica de Madrid, Spain, María Jesús Vázquez-Gallo, Universidad Politécnica de Madrid, Spain.

Rational developable surfaces.

[14:30-14:50] Ziteng Wang*, Northern Illinois University, USA.

L1 splines: model, computation and recent advances.

14:50 - 16:30 (GD-MS and GD-CP)

SIAMGD MS Session #1 in JRS Centre 1420

MS1 (part I): Non-standard spline approximation schemes

Organizers: *Cesare Bracco, University of Florence, Italy, Carlotta Giannelli, University of Florence, Italy.*

[14:50-15:15] Mario Kapl*, Johann Radon Institute for Applied and Computational Mathematics, Austrian Academy of Sciences, Giancarlo Sangalli, Dipartimento di Matematica ``F. Casorati'', Università degli Studi di Pavia, Thomas Takacs, Institute of Applied Geometry, Johannes Kepler University Linz.

C^1 isogeometric spline spaces over planar multi-patch geometries.

[15:15-15:40] Tadej Kanduc*, INdAM, Italy.

Quasi-interpolation quadratures for BEM with hierarchical B-splines.

[15:40-16:05] Aishwarya Pawar*, Carnegie Mellon University, USA, Yongjie Jessica Zhang, Carnegie Mellon University, USA, Cosmin Anitescu, Bauhaus-Universität Weimar, Germany, Timon Rabczuk, King Saud University Riyadh, Saudi Arabia.

Joint Image Segmentation and Registration Based on a Dynamic Level Set Approach Using Truncated Hierarchical B-splines.

[16:05-16:30] David Grossmann*, MTU Aero Engines, Munich, Germany.

Industrial practices unlocked by adaptive splines.

SIAMGD CP Session #3 in JRS Centre 1430

Chair: *Helmut Pottmann, TU Wien, Austria.*

[14:50-15:10] Sebastian Scholtes, formerly RWTH Aachen University, Germany, Henrik Schumacher*, RWTH Aachen University, Germany, Max Wardetzky, University Göttingen, Germany.

Variational Convergence of Discrete Elasticae.

[15:10-15:30] Kai Hormann*, Università della Svizzera italiana, Switzerland, Jianmin Zheng, Nanyang Technological University, Singapore.

Quartic Bézier curves with rational offsets.

[15:30-15:50] Soo Hyun Kim*, Dongguk University-Seoul, South Korea, Hwan Pyo Moon, Dongguk University-Seoul, South Korea.

Deformation of Pythagorean hodograph curves using rectifying control polygons.

16:30 - 16:50 Coffee break at Harbour Center Concourse

16:30 - 18:35

SIAMGD MS Session #2 in JRS 1430

MS2: Volumetric parameterization and mesh generalization.

Organizers: *Falai Chen, University of Science and Technology of China, Xin Li, University of Science and Technology of China.*

[16:30-16:55] Na Lei, Dalian University of Technology, China, Feng Luo, Rutgers University, USA, Jingyao Ke, University of Science and Technology of China, Xiaopeng Zheng, Dalian University of Technology, China, Zhongxuan Luo, Dalian University of Technology, China, Xianfeng Gu*, Stony Brook University, USA.

Hexahedral Meshing and Holonomy.

[16:55-17:20] Na Lei*, Dalian University of Technology, China, Xiaopeng Zheng, Dalian University of Technology, China, Zhongxuan Luo, Dalian University of Technology, China, Xianfeng Gu, Stony Brook University University, USA.

Feature Preserving Hexahedral Meshing.

[17:20-17:45] Gang Xu*, Hangzhou Dianzi University, China.

IGA-suitable volume parameterization with geometric continuity along singular segmentation curves.

[17:45-18:10] Jin Huang*, Zhejiang University, China, Xianzhong Fang, Zhejiang University, China.

Frame Field driven Hex Remeshing.

[18:10-18:35] Hugo Casquero, Department of Mechanical Engineering, Carnegie Mellon University, Xiaodong Wei, Institute of Mathematics, École Polytechnique Fédérale de Lausanne, Switzerland, Deepesh Toshniwal, Institute for Computational Engineering and Sciences, The University of Texas at Austin, USA, Angran Li*, Department of Mechanical Engineering, Carnegie Mellon University, USA, Thomas J.R. Hughes, Institute for Computational Engineering and Sciences, The University of Texas at Austin, USA, Josef Kiendl, Department of Marine Technology, Norwegian University of Science and Technology, Noway, Yongjie Jessica Zhang, Department of Mechanical Engineering, Carnegie Mellon University, USA.
Integrating design and nonlinear Kirchhoff-Love shell analysis using analysis-suitable unstructured T-splines.

16:50 - 18:05 (GD-MS)
SIAMGD MS Session #3 in JRS 1420
MS1 (part II): Non-standard spline approximation schemes
Organizers: *Cesare Bracco, University of Florence, Italy, Carlotta Giannelli, University of Florence, Italy.*

[16:50-17:15] Jiri Kosinka*, University of Groningen, Netherlands.
From CAD models to triangular spline surfaces.
[17:15-17:40] Fracesco Patrizi*, SINTEF, Norway, Carla Manni, University of Rome "Tor Vergata", Francesca Pelosi, University of Rome "Tor Vergata", Hendrik Speleers, University of Rome "Tor Vergata".
A Quasi-interpolation Method Based on LR B-splines.
[17:40-18:05] Casare Bracco*, University of Florence, Italy, Carlotta Giannelli, University of Florence, Italy, Mario Kapl, Johann Radon Institute for Computational and Applied Mathematics, Austria, Rafael Vázquez, Ecole Polytechnique Fédérale de Lausanne, Switzerland.
Isogeometric methods with C^1 hierarchical spline spaces on planar two-patch geometries.

Tuesday, June 18

8:30 - 9:00 Registration at Harbour Center Concourse
9:00 - 10:00 (GD CP)
SIAMGD CP Session #4 in JRS Centre 1420
Chair: *Michael Scott, Brigham Young University, U.S.*
[9:00-9:20] Severinas Zube*, Vilnius University, Lithuania, Rimvydas Krasauskas, Vilnius University, Lithuania.
Rational Offsets of Regular Quadrics Revisited *[Invited CAGD 2018 Paper].*
[9:20-9:40] Fengming Lin, School of Mathematical Sciences, University of Chinese Academy of Sciences, Beijing, China, Li-Yong Shen*, School of Mathematical Sciences, University of CAS, Beijing, China, Chun-Ming Yuan, KLMM, Academy of Mathematics and Systems Sciences, CAS, 100190, Beijing, China, Beijing, China, Zhenpeng Mi, KLMM, Academy of Mathematics and Systems Sciences, CAS, Beijing, China.
Certified space curve fitting and trajectory planning for CNC machining with cubic B-splines *[Invited CAD 2019 Paper].*
[9:40-10:00] Konstantinos Gavriil, Evolute GmbH, Alexander Schiftner, Evolute GmbH, Helmut Pottmann*, TU Wien, Austria and and KAUST, Saudi Arabia.
Optimizing B-spline surfaces for developability and paneling architectural freeform surfaces *[Invited CAD 2019 Paper].*

SIAMGD CP Session #5 in JRS Centre 1430
Chair: *Dan Gonsor, The Boeing Company, U.S.*
[9:00-9:20] Yunbo Zhang*, Rochester Institute of Technology, USA, Tsz-Ho Kwok, Concordia University, Canada.
Customization and Topology Optimization of Compression Casts/Braces on Two-Manifold *Surfaces [Invited CAD 2019 Paper]*
[9:20-9:40] Jianwei Guo*, NLPR, Institute of Automation, Chinese Academy of Sciences, Xiaohong Jia, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Dong-Ming Yan, NLPR, Institute of Automation, Chinese Academy of Sciences
Automatic and high-quality surface mesh generation for CAD models *[Invited CAD 2019 Paper]*

[9:40-10:00] Huachao Mao, University of Southern California, USA, Tsz Ho Kwok*, Concordia University, Canada, Yong Chen, University of Southern California, USA, Charlie C. L. Wang, The Chinese University of Hong Kong.
Adaptive Slicing Based on Efficient Profile Analysis *[Invited CAD 2019 Paper]*

10:00 - 10:20
Coffee break at Harbour Center Concourse
10:20 - 12:00 (GD-MS)
SIAMGD MS Session #4 in JSR 1420
MS3: Geometric Computing for CNC Machining.
Organizer: *Michael Barton, BCAM, Spain.*

[10:20-10:45] Ann-Sofie Fisker, Department of Applied Mathematics and Computer Science, DTU, Denmark , David Brander, Department of Applied Mathematics and Computer Science, DTU, Denmark , Andreas Bærentzen, Department of Applied Mathematics and Computer Science, DTU, Denmark , Jens Gravesen*, Department of Applied Mathematics and Computer Science, DTU, Denmark.
Design for hot-blade cutting.

[10:45-11:10] Li Chen*, The Hong Kong University of Science and Technology, Kai Tang, The Hong Kong University of Science and Technology.
A Novel Robotic Multi-axis Additive Manufacturing System.

[11:10-11:35] Amaia Calleja, the University of the Basque Country, Spain, Pengbo Bo, Harbin Institute of Technology, China, Haizea Gonzalez, the University of the Basque Country, Spain, Michael Barton*, BCAM -- Basque Center for Applied Mathematics, Spain, Luis Norberto de Lacalle, Department of Mechanical Engineering, the University of the Basque Country, Spain.
Highly-accurate 5-axis flank CNC machining with conical tools.

SIAMGD MS Session #5 in JSR 1430
MS4: Industrial Strength Geometric Modeling
Organizers: *Thomas Grandine, The Boeing Company, USA, Huseyin Erdim, The Boeing Company, USA.*

[10:20-10:45] Morad Behandish*, Palo Alto Research Center (PARC), USA, Saigopal Nelaturi, Palo Alto Research Center (PARC), USA.
Hybridization of Manufacturing: Challenges and Future Directions.

[10:45-11:10] Walter Wilson*, Lockheed Martin, USA.
A Language for Ultra-Long-Term CAD Data Preservation.

[11:10-11:35] Craig Bosma*, The Boeing Company, USA.
Rolling up our SLEFEs: Reflections on Putting an Academic Rendering Algorithm to Work.

[11:35-12:00] Huseyin Erdim*, The Boeing company, Thomas Grandine, The Boeing company, USA.
Geometric design challenges for additive manufacturing.

12:00 - 13:30 Lunch on site
13:30 - 15:10 (GD-MS)
SIAMGD MS Session #6 in JSR 1420
MS5: Topology, Geometry and Graphics for Design -- Applications & Theory.
Organizer: *Thomas Peters, University of Connecticut, U.S.*

[13:30-13:55] Thomas Peters*, University of Connecticut, USA.
Topology & Convexity for Optimization in Chemical Engineering.

[13:55-14:20] Dan Gonsor*, The Boeing Company, USA.
Determining Color Location Properties With Respect to a Color Gamut.

[14:20-14:45] Stephen Mann*, University of Waterloo, Canada.
Clifford Algebra Representations for Computer Graphics.

[14:45-15:10] Jiangce Chen, University of Connecticut, Morad Behandish, PARC, USA, Horea Ilies*, University of Connecticut, USA.
Mathematical Abstractions for Engineering Design and Manufacturing.

SIAMGD MS Session #7 in JSR 1430

MS6: Advanced Shape Optimization: Non-smoothness and Time-Dependency

Organizers: *Stephan Schmidt, University of Wuerzburg, Germany, Roland Herzog, Technical University Chemnitz, Germany.*

[13:30-13:55] Stephan Schmidt*, University of Würzburg, Germany, Jørgen Schartum Dokken, Simula Research Laboratory, Norway, Simon Funke, Simula Research Laboratory, Norway.
Multi-Mesh Shape Optimization and Higher Shape Derivatives.

[13:55-14:20] Marc Herrmann*, Universitaet Wuerzburg, Germany, Roland Herzog, TU Chemnitz, Germany, Jose Vidal, Technische Universität Chemnitz, Germany, Stephan Schmidt, University of Würzburg, Germany, Ronny Bergmann, Technische Universität Chemnitz, Germany.
Geometric Inverse Problems and the Total Variation of the Normal.

[14:20-14:45] Rahel Brügger*, University of Basel, Switzerland, Helmut Harbrecht, University of Basel, Switzerland, Johannes Tausch, Southern Methodist University, USA.
On the solution of a time-dependent inverse shape identification problem for the heat equation.

[14:45-15:10] Roland Herzog*, TU Chemnitz, Germany, Stephan Schmidt, University of Würzburg, Germany, Marc Herrmann, University of Würzburg, Germany, Ronny Bergmann, Technische Universität Chemnitz, Jose Vidal-Nunez, Technische Universität Chemnitz, Germany.
Total variation of the normal: properties, discretization and variational problems.

15:10 - 15:30 Coffee break at Harbour Center Concourse

15:50 - 16:30 (GD-CP)

SIAMGD CP Session #6 in JRS Centre 1430

Chair: *Stefanie Hahmann, University Grenoble, France.*

[15:50-16:10] Mokwon Lee*, Voronoi Diagram Research Center, Hanyang University, South Korea, Qing Fang, School of Mathematical Science, University of Science and Technology of China, Youngsong Cho, Voronoi Diagram Research Center, Hanyang University, South Korea, Joonghyun Ryu*, Voronoi Diagram Research Center, Hanyang University, South Korea, Ligang Liu, School of Mathematical Science, University of Science and Technology of China, Deok-Soo Kim, School of Mechanical Engineering/Voronoi Diagram Research Center, Hanyang University, South Korea.
Support-free Elliptic Hollowing for 3D Printing via the Voronoi Diagram of Ellipses *[Invited CAD 2018 Paper].*

[16:10-16:30] Kehua Su, Wuhan University, China, Na Lei, Dalian University of Technology, China, Wei Chen, Dalian University of Technology, China, Li Cui, Beijing Normal University, China, Hang Si, WIAS, Germany, Shikui Chen, Stony Brook University, USA, Xianfeng Gu*, Stony Brook University, USA.
Curvature adaptive surface remeshing by sampling normal cycle *[Invited CAD 2019 Paper].*

15:30 - 17:10 (GD-MS)

SIAMGD MS Session #8 in JSR 1420

MS7: Generalized Barycentric Coordinates in Computational Mechanics

Organizer: *N.Sukumar, University of California, Davis.*

[15:30-15:55] Joseph Bishop*, Sandia National Laboratories, USA.
Polyhedral discretizations using tetrahedral subdivisions, aggregation, and optimization-based shape functions for applications in nonlinear solid mechanics.

[15:55-16:20] Teseo Schneider*, NYU Courant Institute of Mathematical Sciences, USA.
First Steps Toward Black-Box Finite Element Analysis.

[16:20-16:45] Ming-Jun Lai*, University of Georgia, USA.
A Minimization Approach for Constructing Generalized Barycentric Coordinates.

[16:45-17:10] Eric B. Chin, University of California, Davis, USA, N. Sukumar*, University of California, Davis, USA.
Numerical Integration of Homogeneous Functions on Curved Geometries.

16:30 - 18:35
SIAMGD MS Session #9 in JRS 1430
MS8: V-rep and IgA for Design and Additive Manufacturing

Organizers: *Tor Dokken, SINTEF, Norway, Gershion Elber, Technion, Israel.*

[16:30-16:55] Tor Dokken*, SINTEF Digital, Norway.
V-rep and IgA for simulation based design for Additive Manufacturing in the CAxMan-project.
[16:55-17:20] Gershon Elber*, Technion- Israel Institute of Technology, Israel.
Designing Heterogeneous Materials/Microstructures.
[17:20-17:45] Pablo Antolin, Ecole Polytechnique Fédérale de Lausanne, Switzerland, Annalisa Buffa*, Ecole Polytechnique Fédérale de Lausanne, Switzerland, Riccardo Puppi, Ecole Polytechnique Fédérale de Lausanne, Switzerland, Rafael Vazquez, Ecole Polytechnique Fédérale de Lausanne, Switzerland.
Numerical methods on V-reps.
[17:45-18:10] Yuxuan Yu*, Computational Bio-modeling Laboratory, Department of Mechanical Engineering, Carnegie Mellon University, USA, Humphrey Yang, Morphing Matter Lab, Human-Computer Interaction Institute, School of Computer Science, Carnegie Mellon University, USA, Haolin Liu, Morphing Matter Lab, Human-Computer Interaction Institute, School of Computer Science, Carnegie Mellon University, USA, Kuanren Qian, Computational Bio-modeling Laboratory, Department of Mechanical Engineering, Carnegie Mellon University, USA, Jianzhe Gu, Morphing Matter Lab, Human-Computer Interaction Institute, School of Computer Science, Carnegie Mellon University, USA, Lining Yao, Morphing Matter Lab, Human-Computer Interaction Institute, School of Computer Science, Carnegie Mellon University, USA, Yongjie Zhang, Computational Bio-modeling Laboratory, Department of Mechanical Engineering, Carnegie Mellon University, USA,.
SimuLearn: Combining Finite Element Simulation and Machine Learning for Inverse Design and Manufacture of Self-Assembling Viscoelastic Materials.
[18:10-18:35] Turlif Vilbrandt*, Uform, Norway.
Design and Fabrication at the Edge of Natural Systems.

17:10 - 17:30 Coffee break at Harbour Center Concourse
17:30 - 18:30 (SIAM business meeting)
SIAG/GD business meeting in JRS 1420

Wednesday, June 19

8:00 - 8:30 Registration at Goldcorp Center
8:30 - 9:30 Summit Keynote #1, from SIAMGD, Djavad Cinema
Chair: *Richard Zhang, Simon Fraser University, Vancouver, Canada.*
Shahram Izadi, Google LLC, USA.
Virtual Teleportation
9:30 - 9:45 Coffee break
9:45 - 10:45 Summit Keynote #2, from SMI, Djavad Cinema
Holly Rushmeier, Yale University, USA.
New projects in modelling shape and appearance
10:45 - 11:00 Coffee break
11:00 - 12:00 Summit Keynote #3, from Bezier Awardee, Djavad Cinema
Gershon Elber, Technion, Israel.
Title T.B.A
12:00 - 13:30 Lunch on site

13:30 - 14:30 Summit Keynote #4, from GMP, Djavad Cinema

Emily Whiting, Boston University, USA.

Mechanics-Based Design for Computational Fabrication

14:30 - 15:30 Poster FF and public display with coffee and refreshments at in the Djavad lobby

16:20 - 18:00

SIAMGD MS Session #10 in JRS 1420

MS9: Design of rational rigid body motions.

Organizer: *Rida Farouki, University of California, Davis, USA.*

[16:20-16:45] Rida Farouki*, University of California, Davis, USA.

Rational orthonormal frames along space curves.

[16:45-17:10] Marjeta Knez*, IMFM and Faculty of Mathematics and Physics, University of Ljubljana, Slovenia.

Motion interpolation using Pythagorean-hodograph curves with prescribed length.

[17:10-17:35] Hwan Pyo Moon*, Dongguk University-Seoul, South Korea, Rida T. Farouki, University of California, Davis, USA.

Construction of rational adapted frames along closed spatial Pythagorean hodograph curves.

[17:35-18:00] Zbynek Sir*, Charles University in Prague, Czech Republic.

Prescribing derivative vectors of trajectories of rational motions.

SIAMGD CP Session #7 in JRS 1430

Chair: *Bert Juettler, Johannes Kepler University Linz, Austria.*

[16:20-16:40] Helmut Pottmann*, KAUST / TU Wien, Saudi Arabia.

Discrete surfaces in sphere geometries.

[16:40-17:00] Tatyana Sorokina*, Towson University, USA, Snangyou Zhang, University of Delaware, USA.

Bernstein-Bézier techniques for piecewise harmonic polynomials.

[17:00-17:20] Esmeralda Mainar, University of Zaragoza, Spain, Juan Manuel Peña, University of Zaragoza, Spain, Beatriz Rubio*, University of Zaragoza, Spain.

Shape preserving properties of weighted f-transformed systems.

[17:20-17:40] Emiliano Cirillo*, Università della Svizzera italiana, Kai Hormann, Università della Svizzera italiana, Jean Sidon, Israel.

Convergence rates of iterative rational Hermite interpolants.

18:00 - 18:30

SIAM/GD best paper awards in JRS 1420

19:30 - 21:30 Dinner banquet, Kirin Restaurant in Downtown Vancouver