

CG Week 2021 Program

Monday, June 7, 2021

EDT (UTC-4)			
10:00-10:05	Welcome		
10:05-10:35	SoCG Best Paper – Chairs: Kevin Buchin and Éric Colin de Verdière, Assistant: Minghua Wang, Virtual Room: A Lower Boounds for Semialgebraic Range Searching and Stabbing Problems Peyman Afshani and Pingan Cheng		
10:35-10:50	Break		
10:50-12:30	SoCG 1A Chair: Jean Cardinal Assistant: Chunwei Ma Virtual Room: A	SoCG 1B Chair: Brittany Fasy Assistant: Minghua Wang Virtual Room: B	
10:50-11:10	Packing Squares into a Disk with Optimal Worst-Case Density Sándor Fekete, Vijaykrishna Gurunathan, Kushagra Juneja, Phillip Keldenich, Linda Kleist and Christian Scheffer	Sketching Persistence Diagrams Donald Sheehy and Siddharth Sheth	
11:10-11:30	Online Packing to Minimize Area or Perimeter Mikkel Abrahamsen and Lorenzo Beretta	Computing Zigzag Persistence on Graphs in Near-Linear Time Tamal K. Dey and Tao Hou	
11:30-11:50	On Guillotine Separable Packings for the Two-dimensional Geometric Knapsack Problem Arindam Khan, Arnab Maiti, Amatya Sharma and Andreas Wiese	A Sparse Delaunay Filtration Don Sheehy	
11:50-12:10	Improved Approximation Algorithms for 2-Dimensional Knapsack: Packing into Multiple L-Shapes, Spirals, and More Waldo Gálvez, Fabrizio Grandoni, Arindam Khan, Diego Ramírez-Romero and Andreas Wiese	Computing the multicover bifiltration René Corbet, Michael Kerber, Michael Lesnick and Georg Osang	
12:10-12:30	Efficient generation of rectangulations via permutation languages Arturo Merino and Torsten Mütze	A family of metrics from the truncated smoothing of Reeb graphs Erin Chambers, Elizabeth Munch and Tim Ophelders	
12:30-13:00	Break		
13:00-13:20	Media Sneak Preview – Chair: Valentin Polishchuk, Assistant: Minghua Wang, Virtual Room: A		
	<ul style="list-style-type: none"> • Can You Walk This? Eulerian Tours and IDEA Instructions Aaron Becker, Sándor Fekete, Matthias Konitzny, Sebastian Morr and Arne Schmidt. • An Interactive Tool for Experimenting with Bounded-Degree Plane Geometric Spanners Anirban Ghosh, Fred Anderson, Matthew Graham, Lucas Mougeot and David Wisnosky 		
13:20-14:40	YRF 1A Chair: Marcel Roeloffzen Assistant: Chunwei Ma Virtual Room: A	YRF 1B Chair: Haitao Wang Assistant: Ziyun Huang Virtual Room: B	YRF 1C Chair: Jie Xue Assistant: Minghua Wang Virtual Room: C

13:20-13:40	Perfect Matchings with Crossings Oswin Aichholzer, Ruy Fabila-Monroy, Philipp Kindermann, Irene Parada, Rosna Paul, Daniel Perz, Patrick Schnider and Birgit Vogtenhuber	Independent Hyperplanes in Oriented Paving Matroids Lamar Chidiac and Winfried Hochstättler	Using Generalized Heegaard Splittings in Computational 3-Manifold Topology Kristóf Huszár
13:40-14:00	Plane Matchings in Simple Drawings of Complete Graphs Oswin Aichholzer, Alfredo Garcia, Javier Tejel, Birgit Vogtenhuber and Alexandra Weinberger	Edge-unfolding nearly flat prismatoids Manuel Radons	Homotopical decompositions of simplicial and Vietoris-Rips complexes Wojciech Chachólski, Alvin Jin, Martina Scolamiero and Francesca Tombari
14:00-14:20	Untangling Almost Outerplanar Drawings Sujoy Bhore, Guangping Li, Martin Nöllenburg, Ignaz Rutter and Hsiang-Yun Wu	A Geometric Approach to Papillae Identification in 3D Meshes Rayna Andreeva, Anwasha Sarkar and Rik Sarkar	Realizing Persistent Homology by Subcomplexes Magnus Bakke Botnan and Pepijn Edwin Robert Roos Hoefgeest.
14:20-14:40	Algorithms For Max Cut on Unit Interval and Laminar Interval Graphs Utkarsh Joshi, Rahul Saladi and Josson Thoppil	On the range of two-distance graphs Péter Ágoston.	Efficient two-parameter persistence computation via cohomology Fabian Lenzen, Ulrich Bauer and Michael Lesnick
14:40-14:50	Break		
14:50-15:50	YRF 2A Chair: Jie Xue Assistant: Chunwei Ma Virtual Room: A	YRF 2B Chair: Haitao Wang Assistant: Ziyun Huang Virtual Room: B	YRF 2C Chair: Don Sheehy Assistant: Minghua Wang Virtual Room: C
14:50-15:10	An exact optimal algorithm for the discrete median line segment problem in the plane? Ovidiu Daescu and Ka Yaw Teo.	Package delivery using handoffs among collaborating heterogeneous agents Kien Huynh and Joseph Mitchell.	On the adjacency structures of planar point-set triangulations Logan Graham.
15:10-15:30	The Visibility Center of a Polygon Anna Lubiw and Anurag Murty Naredla.	Moving Robots One by One is Hard Tzvika Geft and Dan Halperin.	Connecting 3-manifold triangulations with semi-monotonic sequences of bistellar flips Benjamin A. Burton and Alexander He.
15:30-15:50	Large Perimeter Objects Surrounded by 1.5D Terrains Vahideh Keikha.	Enumerating All Convex Polyhedra Glued from Squares in Polynomial Time Stefan Langerman, Nicolas Potvin and Boris Zolotov.	Triangulations of Exotic 4-Manifolds Rhuaidi Burke and Benjamin Burton.
15:50-16:50	Discussion Forum Chair: Michael Hoffmann, Assistant: Christine Belus, Virtual Room: Discussion Room		

Tuesday, June 8, 2021

10:00-11:00	Invited Talk – Chair: Éric Colin de Verdière Assistant: Chunwei Ma, Virtual Room: A On Laplacians Robert Ghrist	
11:00-11:10	Break	
11:10-12:50	SoCG 2A Chair: Pankaj Agarwal Assistant: Chunwei Ma Virtual Room: A	SoCG 2B Chair: Stefan Felsner Assistant: Minghua Wang Virtual Room: B
11:10-11:30	Throwing a sofa through the window Dan Halperin, Micha Sharir and Itay Yehuda	Complexity of Maximum Cut on Interval Graphs Ranendu Adhikary, Kaustav Bose, Satwik Mukherjee and Bodhayan Roy
11:30-11:50	On Ray Shooting for Triangles in 3-Space and Related Problems Esther Ezra and Micha Sharir	Adjacency Graphs of Polyhedral Surfaces Elena Arseneva, Linda Kleist, Boris Klemz, Maarten Löffler, André Schulz, Birgit Vogtenhuber and Alexander Wolff
11:50-12:10	Stabbing Convex Bodies with Lines and Flats Sariel Har-Peled and Mitchell Jones.	Polygon-Universal Graphs Tim Ophelders, Ignaz Rutter, Bettina Speckmann and Kevin Verbeek
12:10-12:30	Faster Algorithms for Largest Empty Rectangles and Boxes Timothy M. Chan	Classifying Convex Bodies by their Contact and Intersection Graphs Anders Aamand, Mikkel Abrahamsen, Jakob Bæk Tejs Knudsen and Peter M. R. Rasmussen
12:30-12:50	Escaping the Curse of Spatial Partitioning: Matchings with Low Crossing Numbers and their Applications Monika Csikos and Nabil H. Mustafa	Combinatorial Resultants in the Algebraic Rigidity Matroid Goran Malic and Ileana Streinu
12:50-13:20	Break	
13:20-14:50	Minisymposium on Computational Topology 1 Chairs: Ulrich Bauer, Arnaud de Mesmay, and Uli Wagner Assistant: Minghua Wang Virtual Room: A	Workshop on Geometry & Machine Learning 1 Chairs: Hu Ding and Jeff Phillips Assistant: Chunwei Ma Virtual Room: B
13:20-14:05	Invited talk: Simplicial approximation to CW-complexes in practice Raphaël Tinarrage	Invited Talk: Geometry and Landscape for Nonconvex Functions Rong Ge
14:05-14:20	Invited talk: Topology and Geometry of Random Polyominoes Erika Roldan	Optimal Algorithms for Range Searching over Multi-Armed Bandits Siddharth Barman, Ramakrishnan Krishnamurthy, Saladi Rahul
14:20-14:35		Geometric Disentanglement by Random Convex Polytopes Michael Joswig, Marek Kaluba, Lukas Ruff
14:35-14:50		Obstructing Classification Via Projection Pantea Haghighatkhah, Wouter Meulemans, Bettina Speckmann, Jerome Urhausen, Kevin Verbeek
14:50-15:00	Break	
15:00-16:30	Minisymposium on Computational Topology 2 Chairs: Ulrich Bauer, Arnaud de Mesmay, and Uli Wagner	Workshop on Geometry & Machine Learning 2 Chairs: Hu Ding and Jeff Phillips Assistant: Chunwei Ma

	Assistant: Minghua Wang Virtual Room: A	Virtual Room: B
15:00-15:15	Invited talk: Rational homotopy theory and decidability of the extension problem Fedor Manin	Classification based on Topological Data Analysis Rolando Kindelan, Jose Frias, Mauricio Cerda, Nancy Hitschfeld
15:15-15:30		Fuzzy Simplicial Networks: A Topology-Inspired Model to Improve Task Generalization in Few-shot Learning Henry Kvinge, Zachary New, Nico Courts, Jung H. Lee, Lauren A. Phillips, Courtney D. Corley, Aaron Tuor, Andrew Avila, Nathan O. Hodas
15:30-15:45		Geometric Message Passing Schemes with Cell Complex Neural Networks Mustafa Hajjij, Kyle Istvan, Ghada Zamzmi
15:45-16:00	Invited talk: Minimum weight disk triangulations and fillings Yuval Peled	Training Neural Networks is ER-Complete Mikkel Abrahamsen, Linda Kleist, and Tillmann Miltzow
16:00-16:15		Truncated Log-concave Sampling with Reflective Hamiltonian Monte Carlo Apostolos Chalkis, Vissarion Fisikopoulos, Marios Papachristou, Elias Tsigaridas
16:15-16:30		Boundary-Sensitive Approach for Approximate Nearest-Neighbor Classification Alejandro Flores-Velazco and David M. Mount

Wednesday, June 9, 2021

10:00-11:00	SoCG 3A Chair: Anne Driemel Assistant: Chunwei Ma Virtual Room: A	SoCG 3B Chair: Ulrich Bauer Assistant: Minghua Wang Virtual Room: B
10:00-10:20	Translating Hausdorff is Hard: Fine-Grained Lower Bounds for Hausdorff Distance Under Translation Karl Bringmann and André Nusser	A stepping-up lemma for topological set systems Xavier Goaoc, Andreas Holmsen and Zuzana Patáková
10:20-10:40	Approximating the (Continuous) Fréchet Distance Connor Colombe and Kyle Fox	Optimal bounds for the colorful fractional Helly theorem Denys Bulavka, Afshin Goodarzi and Martin Tancer
10:40-11:00	Chasing Puppies: Mobile Beacon Routing on Closed Curves Mikkel Abrahamsen, Jeff Erickson, Irina Kostitsyna, Maarten Löffler, Till Miltzow, Jérôme Urhausen, Jordi Vermeulen and Giovanni Viglietta	Sunflowers in set systems of bounded dimension Jacob Fox, Janos Pach and Andrew Suk
11:00-11:10	Break	
11:10-12:10	SoCG 4A Chair: Michiel Smid Assistant: Chunwei Ma	SoCG 4B Chair: Diane Souvaine Assistant: Minghua Wang

	Virtual Room: A	Virtual Room: B
11:10-11:30	Reliable Spanners for Metric Spaces Sariel Har-Peled, Manor Mendel and Dániel Oláh	Colouring polygon visibility graphs and their generalizations James Davies, Tomasz Krawczyk, Rose McCarty and Bartosz Walczak
11:30-11:50	On the Edge Crossings of the Greedy Spanner David Eppstein and Hadi Khodabandeh	A Practical Algorithm with Performance Guarantees for the Art Gallery Problem Simon Hengeveld and Till Miltzow
11:50-12:10	Light Euclidean Steiner Spanners in the Plane Sujoy Bhore and Csaba Toth	No Krasnoselskii Number for General Sets Chaya Keller and Micha A. Perles
12:10-12:40	Break	
12:40-13:40	CG Challenge – Chair: Sándor Fekete, Assistant: Chunwei Ma, Virtual Room: A <ul style="list-style-type: none"> • Welcome and Overview Sándor Fekete • Technical Comments Dominik Krupke • Coordinated Motion Planning Through Randomized k-Opt Jack Spalding-Jamieson, Paul Liu, Brandon Zhang, and Da Wei Zheng, • A Simulated Annealing Approach to Coordinated Motion Planning Hyeeyun Yang and Antoine Vigneron • Shadoks Approach to Low-Makespan Coordinated Motion Planning Loïc Crombez, Guilherme D. da Fonseca, Yan Gerard, Aldo Gonzalez-Lorenzo, Pascal Lafourcade, and Luc Libralesso • Questions and Discussion • Award Ceremony • Outlook 	
13:40-15:10	Workshop on Geometric and Topological Methods in Biomedical Image Analysis 1 Chairs: Bei Wang and Chao Chen Assistant: Chunwei Ma Virtual Room: A	Workshop on Geometry and Mobility 1 Chairs: Jiaxin Ding, Abhirup Ghosh, and Rik Sarkar Assistant: Minghua Wang Virtual Room: B
13:40-14:25	Invited Talk: ManifoldNet: A Deep Neural Network for Manifold-Valued Data with Applications Baba C. Vemuri	Invited Talk: Data structures for proximity searching under the Fréchet distance Anne Driemel
14:25-14:40		Contributed topics discussion session: applications, datasets and open problems
14:40-15:10	Invited Talk: Geometric Data Alignment of Biomedical Signals and Shapes Shantanu Joshi	
15:10-15:20	Break	
15:20-16:50	Business Meeting – Chair: Michael Hoffmann, Assistant: Christine Belus, Virtual Room: Discussion Room	

Thursday, June 10, 2021

10:00-11:00	Invited Talk – Chair: Kevin Buchin, Assistant: Minghua Wang, Virtual Room: A 3SUM and related problems in fine-grained complexity Virginia Vassilevska Williams
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11:00-11:10	Break	
11:10-12:50	SoCG 5A Chair: Guilherme Dias Da Fonseca Assistant: Chunwei Ma Virtual Room: A	SoCG 5B Chair: Amir Nayyeri Assistant: Minghua Wang Virtual Room: B
11:10-11:30	Approximate Range Counting under Differential Privacy Ziyue Huang and Ke Yi	Strong Hanani-Tutte for the Torus Radoslav Fulek, Marcus Schaefer and Michael Pelsmajer
11:30-11:50	More Dynamic Data Structures for Geometric Set Cover with Sublinear Update Time Timothy M. Chan and Qizheng He	The Density Fingerprint of a Periodic Point Set Herbert Edelsbrunner, Teresa Heiss, Vitaliy Kurlin, Philip Smith and Mathijs Wintraecken
11:50-12:10	A Parallel Batch-Dynamic Data Structure for the Closest Pair Problem Yiqiu Wang, Shangdi Yu, Yan Gu and Julian Shun	Minimal Delaunay triangulations of hyperbolic surfaces Matthijs Ebbens, Hugo Parlier and Gert Vegter
12:10-12:30	Approximate Nearest-Neighbor Search for Line Segments Ahmed Abdelkader and David Mount	Algorithms for Contractibility of Compressed Curves on 3-Manifold Boundaries Erin Chambers, Francis Lazarus, Arnaud De Mesmay and Salman Parsa
12:30-12:50	Near Neighbour Search via Efficient Average Distortion Embeddings Deepanshu Kush, Aleksandar Nikolov and Haohua Tang	Parameterized Complexity of Quantum Knot Invariants Clément Maria
12:50-13:20	Break	
13:20-14:50	Minisymposium on Computational Topology 3 Chairs: Ulrich Bauer, Arnaud de Mesmay, and Uli Wagner Assistant: Minghua Wang Virtual Room: A	Workshop on Geometry and Mobility 2 Chairs: Jiaxin Ding, Abhirup Ghosh, and Rik Sarkar Assistant: Chunwei Ma Virtual Room: B
13:20-13:35	Invited talk: High-performance computing with knots, 3-manifolds and 4-manifolds Ben Burton	Orientation-Preserving Vectorized Distance Between Curves. Jeff Phillips and Hasan Pourmahmood-Aghababa
13:35-13:50		Route Reconstruction from Traffic Flow via Representative Trajectories. Bram Custers, Wouter Meulemans, Bettina Speckmann and Kevin Verbeek
13:50-14:05		A Game Theoretic Approach to Transport Planning Alastair Maxwell and Rik Sarkar
14:05-14:20	Invited talk: Unknot recognition in quasi-polynomial time Marc Lackenby	Exact Vertex-Aligned Sub-Trajectory Proximity Searches under the Continuous Fréchet Distance Joachim Gudmundsson, Martin P. Seybold and John Pfeifer
14:20-14:35		Toward Persistent Homology for Moving Points Ondrej Draganov, Farid Karimipour and Herbert Edelsbrunner
14:35-14:50		
14:50-15:00	Break	

15:00-16:30	Minisymposium on Computational Topology 4 Chairs: Ulrich Bauer, Arnaud de Mesmay, and Uli Wagner Assistant: Minghua Wang Virtual Room: A	Workshop on Geometry and Mobility 3 Chairs: Jiaxin Ding, Abhirup Ghosh, and Rik Sarkar Assistant: Chunwei Ma Virtual Room: B
15:00-15:45	Invited talk: The Directional Transform: From Theory to Practice Elizabeth Munch	Invited Talk: Cyber-Physical Systems for Large-Scale On-demand Delivery Desheng Zhang
15:45-16:30	Invited talk: Discrete constructions and geometry driven collapses for shape reconstruction Dominique Attali	Panel Discussion: Future research in geometry of mobility

Friday, June 11, 2019

10:00-11:20	SoCG 6A Chair: Antoine Vigneron Assistant: Chunwei Ma Virtual Room: A	SoCG 6B Chair: Jonathan Spreer Assistant: Minghua Wang Virtual Room: B
10:00-10:20	On rich points and incidences with restricted sets of lines in 3-space Micha Sharir and Noam Solomon	An Optimal Deterministic Algorithm for Geodesic Farthest-Point Voronoi Diagrams in Simple Polygons Haitao Wang
10:20-10:40	Sublinear average-case shortest paths in weighted unit-disk graphs Adam Karczmarz, Jakub Pawlewicz and Piotr Sankowski	Counting Cells of Order-k Voronoi Tessellations in \mathbb{R}^3 with Morse Theory Ranita Biswas, Sebastiano Cultrera di Montesano, Herbert Edelsbrunner and Morteza Saghafian
10:40-11:00	An integer programming formulation using convex polygons for the convex partition problem Hadrien Cambazard and Nicolas Catusse	Restricted Constrained Delaunay Triangulations Marc Khoury and Jonathan Shewchuk
11:00-11:20	Characterizing Universal Reconfigurability of Modular Pivoting Robots Hugo Akitaya, Erik D. Demaine, Andrei Gonczi, Dylan H. Hendrickson, Adam Hesterberg, Matias Korman, Oliver Kortner, Jayson Lynch, Irene Parada and Vera Sacristán	Tracing isomanifolds in \mathbb{R}^d in time polynomial in d using Coxeter-Freudenthal-Kuhn triangulations Jean-Daniel Boissonnat, Siargey Kachanovich and Mathijs Wintraecken
11:20-11:30	Break	
11:30-12:50	SoCG 7A Chair: Jeff Phillips Assistant: Chunwei Ma Virtual Room: A	SoCG 7B Chair: Bernd Gärtner Assistant: Minghua Wang Virtual Room: B
11:30-11:50	On rich lenses in planar arrangements of circles and related problems Esther Ezra, Orit E. Raz, Micha Sharir and Joshua Zahl	Geometric algorithms for sampling the flux space of metabolic networks Apostolos Chalkis, Vissarion Fisikopoulos, Elias Tsigaridas and Haris Zafeiropoulos
11:50-12:10	Rectilinear Steiner Trees in Narrow Strips Henk Alkema and Mark de Berg.	Convergence of Gibbs Sampling: Coordinate Hit-and-Run Mixes Fast

		Aditi Laddha and Santosh Vempala
12:10-12:30	Two-sided Kirschbraun Theorem Arturs Backurs, Sepideh Mahabadi, Konstantin Makarychev and Yury Makarychev	On Undecided LP and Active Learning Using Proximity Queries Stav Ashur and Sarel Har-Peled
12:30-12:50	Orientation preserving Maps of the $n \times n$ Grid Imre Bárány, Attila Pór and Pavel Valtr	
12:50-13:20	Break	
13:20-14:30	Awards: Test of Time & Best Student Presentation – Chair: Pankaj Agarwal, Assistant: Minghua Wang, Virtual Room: A <ul style="list-style-type: none"> • Best Student Presentation Award Michael Hoffmann and Bettina Speckmann • Test of Time Awards Introduction Pankaj Agarwal • The analysis of a simple k-means clustering algorithm Tapas Kanungo, David M. Mount, Nathan S. Netanyahu, Christine D. Piatko, Ruth Silverman, Angela Y. Wu • Constrained Delaunay Triangulations L. Paul Chew • Test of time Award Outlook Pankaj Agarwal • A short tribute to Lars Arge Pankaj Agarwal 	
14:30-14:40	Break	
14:40-16:10	Workshop on Geometric and Topological Methods in Biomedical Image Analysis 2 Chairs: Bei Wang and Chao Chen Assistant: Chunwei Ma Virtual Room: A	
14:40-15:10	Invited Talk: Topological Analysis of Immunofluorescence Images Mathieu Carrière	
15:10-15:40	Invited Talk: Signed Distance Persistent Homology of Tubular Shapes Anna Song	
15:40-16:10	Invited Talk: Surface-Based Connectivity Integration Zhengwu Zhang	
16:10-16:40	Invited Talk: Radiomics and Pathomics in Precision Medicine – Why Domain Still Matters Prateek Prasanna	