

María del Pilar Cano Vila

Curriculum Vitae

Jordi Girona 1-3
Omega building, office 423
08034 Barcelona, Spain
☎ +34652416449
✉ m.pilar.cano@upc.edu

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Academic positions

July 2020 - **Postdoctoral Researcher**, *Algorithm Research Group, Department of Compute Science, Université Libre de Bruxelles, Brussels, Belgium.*

Education

May 2016 – June 2020 **Ph.D.**, *Applied Mathematics - Summa Cum Laude, Universitat Politècnica de Catalunya, Barcelona, Spain.*

Ph.D., *Computer Science, Carleton University, Ottawa, Canada.*
(Supervised by Prosenjit Bose and Rodrigo I. Silveira)

Sept. 2014– Nov. 2015 **M.Sc.**, *Advanced Mathematics and Mathematical Engineering, Universitat Politècnica de Catalunya, Barcelona, Spain.*

Aug. 2010– Aug. 2014 **B.Sc.**, *with honors in Mathematics, Universidad Nacional Autónoma de México (UNAM), Mexico city, Mexico.*

Teaching experience

Sept–Dec 2019 **Teaching Assistant**, *School of Computer Science, Carleton University, Ottawa, Course: Design & Analysis of Algorithms II.*

Sept–Dec 2018 **Teaching Assistant**, *School of Computer Science, Carleton University, Ottawa, Course: Design & Analysis of Algorithms II.*

Feb–Jul 2014 **Teaching Assistant**, *School of Science, UNAM, Mexico City, Courses: Introduction to Graph and Game theory.*

Sept–Dec 2013 **Teaching Assistant**, *School of Science, UNAM, Mexico City, Courses: Mathematics I for Biologists.*

Feb–Jul 2013 **Student's assistant on math problems**, *Taller de matemáticas, Department of Mathematics, School of science, UNAM, Mexico City.*

Spoken Languages

Spanish Native
English Fluent
Italian Intermediate
Catalan Basic

Programming Languages

Basic C++, R, TensorFlow, NLTK
Intermediate Python
Advanced LaTeX

Awards

2018 **Best presentation award**, *Pole Dancing: 3D Morphs for Tree Drawings*, with E. Arseneva.
26th International Symposium on Graph Drawing and Network Visualization 2018

- 2018 **Best paper award**, *Pole Dancing: 3D Morphs for Tree Drawings*, with E. Arseneva, P. Bose, A. D'Angelo, V. Dujmovic, F. Frati, S. Langerman, and A. Tappini.
26th International Symposium on Graph Drawing and Network Visualization 2018
- Apr 2016–
March 2020 **CONACyT scholarship for graduate studies abroad**, *study and living cost*.
- Sept 2014–
Dec 2015 **CONACyT scholarship for graduate studies abroad**, *study and living cost*.
- 2014 **2nd candidate for Gabino Barrera Medal for undergraduate students**, *Mathematics*, This award is given to the best student for each undergraduate program at UNAM where only the top five of each program become candidates.

Interests

Algorithms, Computational Geometry, Graph Drawing, Geographic Information Systems, Discrete Geometry, Graph Theory, Combinatorial Games, Natural Language Processing, Probability

PhD Thesis

- Title *Generalized Delaunay triangulations: Graph-theoretic properties and Algorithms*
- Supervisors Prosenjit Bose and Rodrigo I. Silveira
- Abstract We studied different graph-theoretical properties and algorithms for different types of generalized Delaunay graphs, such as Hamiltonicity, flip graphs and algorithms that construct affine invariant triangulations.

Master's Thesis

- Title *Rainbow Matchings in Hypergraphs*
- Supervisor Oriol Serra
- Abstract An overview of the latest results of rainbow matchings in graphs and hypergraphs. Also, some new bounds for the size of matchings in r -partite r -uniform hypergraphs such that there is a rainbow matching.

Bachelor's Thesis

- Title *Hamiltonicity in a generalization of bipartite tournaments*
- Supervisors Hortensia Galeana-Sánchez and Ilán A. Goldfeder.
- Abstract A constructive proof for a sufficient and necessary condition of having a Hamiltonian cycle on a \mathcal{P} -composition of a cycle.

Publications

Journals

- published **P. Cano, H. Galeana-Sánchez and I. Goldfeder**, *Some results on the existence of Hamiltonian cycles in \mathcal{P} -compositions of bipartite digraphs*, AKCE International Journal of Graphs and Combinatorics, 1–7, 2020.
- published **P. Bose, P. Cano, M. Saumell, and R. I. Silveira**, *Hamiltonicity for convex shape Delaunay and Gabriel graphs*, Computational Geometry: Theory and Applications, 101629, 2020.
Special Issue on selected papers from WADS 2019.
- published **E. Arseneva, P. Bose, P. Cano, A. D'Angelo, V. Dujmovic, F. Frati, S. Langerman, and A. Tappini**, *Pole Dancing: 3D Morphs for Tree Drawings*, Journal of Graph Algorithms and Applications, 23, 579–602, 2019.
Special Issue on selected papers from GD 2018.

Preprints

- preprint **Y. Bahoo, A. Biniiaz, P. Cano, F. Chanchary, J. Iacono, K. Jain, E. Khramtcova, A. Lubiw, D. Mondal, K. Sheikhan and C. D. Toth**, *Compatible Paths on Labelled Point Sets*, arXiv preprint arXiv:2004.07996.
- preprint **O. Arizmendi, P. Cano, and C. Huemer**, *On the number of crossings in a random labelled tree with vertices in convex position*, arXiv preprint arXiv:1902.05223.

Peer-reviewed conferences

- accepted, Feb 2020 **E. Arseneva, P. Bose, P. Cano, and R. I. Silveira**, *Flips in higher order Delaunay triangulations*, 14th Latin American Theoretical Informatics Symposium (LATIN), 2020.
- published **P. Bose, P. Cano, M. Saumell, and R. I. Silveira**, *Hamiltonicity for convex shape Delaunay and Gabriel graphs*, 16th Algorithms and Data Structures Symposium (WADS), 196–210, 2019.
Extended from the EuroCG19 version - invited to special issue on selected papers from WADS 2019 (CGTA).
- published **P. Bose, P. Cano, and R. I. Silveira**, *Affine invariant triangulations*, Proceedings 31st Canadian Conference in Computational Geometry (CCCG), 250–256, 2019.
- published **E. Arseneva, P. Bose, P. Cano, A. D’Angelo, V. Dujmovic, F. Frati, S. Langerman, and A. Tappini**, *Pole Dancing: 3D Morphs for Tree Drawings*, Proceedings 26th International Symposium on Graph Drawing and Network Visualization (GD), 371–384, 2018.
Best paper award - invited to special issue on selected papers from GD18.
- published **Y. Bahoo, A. Biniiaz, P. Cano, F. Chanchary, J. Iacono, K. Jain, E. Khramtcova, A. Lubiw, D. Mondal, K. Sheikhan and C. D. Toth**, *Compatible Paths on Labelled Point Sets*, Proceedings 31st Canadian Conference in Computational Geometry (CCCG), 54–60, 2018.

Extended abstracts

- published **E. Arseneva, P. Bose, P. Cano, and R. I. Silveira**, *Flips in higher order Delaunay triangulations*, Abstracts 36th European Workshop on Computational Geometry (EuroCG), 2020.
- published **P. Bose, P. Cano, M. Saumell, and R. I. Silveira**, *Hamiltonicity for convex shape Delaunay and Gabriel graphs*, Abstracts 35th European Workshop on Computational Geometry (EuroCG), 2019.
- published **P. Bose, P. Cano, and R. I. Silveira**, *Sequences of spanning trees for L_∞ -Delaunay triangulations*, Abstracts 34th European Workshop on Computational Geometry (EuroCG), 2018.
- published **P. Cano, G. Perarnau and O. Serra**, *Rainbow spanning structures in bounded edge-colorings of graphs*, Electronic Notes in Discrete Mathematics, 61, 199–205, 2017.
- published **P. Cano, G. Perarnau and O. Serra**, *Rainbow perfect matchings in r -partite graph structures*, Electronic Notes in Discrete Mathematics, 54, 193–198, 2016.

Talks at conferences

- March, 2020 **Flips in higher order Delaunay triangulations**, 36th European Workshop on Computational Geometry (EuroCG), University of Würzburg, Würzburg, Germany.
Video-conference
- August, 2019 **Affine invariant triangulations**, 31st Canadian Conference in Computational Geometry (CCCG), University of Alberta, Edmonton, Canada.
- August, 2019 **Hamiltonicity for convex shape Delaunay and Gabriel graphs**, 16th Algorithms and Data Structures Symposium (WADS), University of Alberta, Edmonton, Canada.

- July, 2019 **Affine invariant triangulations**, *XVIII Spanish Meeting on Computational Geometry (EGC)*, Universitat de Girona, Girona, Spain.
- March, 2019 **Hamiltonicity for convex shape Delaunay and Gabriel graphs**, *35th European Workshop on Computational Geometry (EuroCG)*, Universiteit Utrecht, Utrecht, the Netherlands.
- September, 2018 **Pole Dancing: 3D Morphs for Tree Drawings**, *with Elena Arseneva*, 26th International Symposium on Graph Drawing and Network Visualization (GD), Universitat Politècnica de Catalunya, Barcelona, Spain.
Best presentation award
- March, 2018 **Sequences of spanning trees for L_∞ -Delaunay triangulations**, *34th European Workshop on Computational Geometry (EuroCG)*, Universiteit Utrecht, Freie Universität Berlin, Berlin, Germany
- July, 2016 **Rainbow perfect matchings in r -partite graph structures**, *Discrete Mathematics Days 2016*, Universitat Politècnica de Catalunya, Barcelona, Spain.

Workshops (invitation only) and conferences attended

- March, 2020 **36th European Workshop on Computational Geometry**, *Video conference*, University of Würzburg, Würzburg, Germany.
- February, 2020 **8th Workshop on Geometry and Graphs**, Bellairs Research Institute, Barbados.
- December, 2019 **2nd Hawaii Workshop on Parallel Algorithms and Data Structures**, University of Honolulu, Honolulu, U.S.A.
- August, 2019 **31st Canadian Conference on Computational Geometry**, University of Alberta, Edmonton, Canada.
- August, 2019 **16th Algorithms and Data Structures Symposium**, University of Alberta, Edmonton, Canada.
- July, 2019 **XVIII Spanish Meeting on Computational Geometry**, Universitat de Girona, Girona, Spain.
- March, 2019 **35th European Workshop on Computational Geometry**, Utrecht University, Utrecht, the Netherlands.
- March, 2019 **7th Workshop on Geometry and Graphs**, Bellairs Research Institute, Barbados.
- February, 2019 **Workshop "Beyond-Planar Graphs: Combinatorics, Models and Algorithms"**, Schloss Dagstuhl, Germany.
- September, 2018 **26th International Symposium on Graph Drawing and Network Visualization**, Universitat Politècnica de Catalunya, Barcelona, Spain.
- June, 2018 **34th International Symposium on Computational Geometry**, ELTE, Budapést, Hungary.
- June, 2018 **5th Austrian-Japanese-Mexican-Spanish Workshop on Discrete Geometry**, Centre de Recerca Matemàtica, Bellaterra, Spain.
- May, 2018 **CONNECT Workshop on Geometric and Algorithmic Aspects of Networks**, Centre de Recerca Matemàtica, Bellaterra, Spain.
- April–May, 2018 **Intensive Research Program on Discrete, Combinatorial and Computational**, Centre de Recerca Matemàtica, Bellaterra, Spain.
- March, 2018 **34th European Workshop on Computational Geometry**, Freie Universität Berlin, Berlin, Germany.
- March, 2018 **6th Workshop on Geometry and Graphs**, Bellairs Research Institute, Barbados.
- November, 2017 **The ACM Canadian Celebration of Women in Computing**, Montreal, Canada.
- August, 2017 **Fields Workshop on Discrete and Computational Geometry**, Carleton University, Ottawa, Canada.

- July, 2017 **29th Canadian Conference on Computational Geometry**, Carleton University, Ottawa, Canada.
- June, 2017 **XVII Spanish Meeting on Computational Geometry**, Universitat d'Alacant, Alicante, Spain.
- June, 2017 **CONNECT Workshop on Geometric Networks**, Universitat Politècnica de Catalunya, Barcelona, Spain.
- July, 2016 **Jornadas de Matematica Discreta y Algoritmica**, Universitat Politècnica de Catalunya, Barcelona, Spain.
- May, 2016 **13th European Research Week on Geometric Graphs**, Universitat Politècnica de Catalunya, Barcelona, Spain.
- July, 2015 **XVI Spanish Meeting on Computational Geometry**, Universitat Politècnica de Catalunya, Barcelona, Spain.
- March, 2014 **XXIX Coloquio Víctor Neumann-Lara de Teoría de las Gráficas**, Boca del Río, Veracruz, México.
- March, 2013 **XXVIII Coloquio Víctor Neumann-Lara de Teoría de las Gráficas**, Morelia, Michoacán, México.