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María del Pilar Cano Vila

Curriculum Vitae

Last update: June, 2021

Academic positions

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

Education

May 2016 – June 2020 **Ph.D.**, *Applied Mathematics* - 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

2016–2020 **CONACyT scholarship for graduate studies abroad**, *study and living cost.*

2014–2015 **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 programme at UNAM where only the top five of each programme 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 **P. Bose, P. Cano, R. Fagerberg, J. Iacono, R. Jacob, and S. Langerman**, *Fragile Complexity of Adaptive Algorithms*, arXiv preprint arXiv:2102.00338, 2021.

preprint **P. Bose, P. Cano, and R. I. Silveira**, *Affine invariant triangulations*, arXiv preprint arXiv:2011.02197, 2020.

preprint **E. Arseneva, P. Cano, L. Kleist, T. Mchedlidze, S. Mehrabi, I. Parada, and P. Valtr**, *Upward Point Set Embeddings of Paths and Trees*, arXiv preprint arXiv:2012.10525., 2020.

preprint **Y. Bahoo, A. Biniaz, 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, 2020.

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, 2019.

Peer-reviewed conferences

published **P. Bose, P. Cano, R. Fagerberg, J. Iacono, R. Jacob, and S. Langerman**, *Fragile Complexity of Adaptive Algorithms*, In Proceedings of the 12th International Conference on Algorithms and Complexity (CIAC), 144–157, 2021.
Invited to special issue on selected papers from CIAC21

published **E. Arseneva, P. Cano, L. Kleist, T. Mchedlidze, S. Mehrabi, I. Parada, and P. Valtr**, *Upward Point Set Embeddings of Paths and Trees*, In Proceedings of the 15th International Conference and Workshops on Algorithms and Computing (WALCOM), 234–246, 2021.

published **E. Arseneva, P. Bose, P. Cano, and R. I. Silveira**, *Flips in higher order Delaunay triangulations*, In Proceedings of the 14th Latin American Theoretical Informatics Symposium (LATIN), 223–234, 2020.

published **P. Bose, P. Cano, M. Saumell, and R. I. Silveira**, *Hamiltonicity for convex shape Delaunay and Gabriel graphs*, In Proceedings of the 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*, In Proceedings of the 31st Canadian Conference in Computational Geometry (CCCG), 250–256, 2019.
Submitted to Computer Aided Geometric Design.

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*, In Proceedings of the 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. Biniaz, 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*, In Proceedings of the 30th 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

May, 2021 **Fragile Complexity of Adaptive Algorithms**, *12th International Conference on Algorithms and Complexity (CIAC)*, University of Cyprus, Larnaka, Cyprusl.
Video-conference

January, 2021 **Flips in higher order Delaunay triangulations**, *14th Latin American Theoretical Informatics Symposium (LATIN)*, University of Saõ Paulo, Saõ Paulo, Brazil.
Video-conference

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)*, Frie Univertät Berlin, Berlin, Germany.

July, 2016 **Rainbow perfect matchings in r-partite graph structures**, *Discrete Mathematics Days 2016*, Universitat Politècnica de Catalunya, Barcelona, Spain.

Participation at workshops (invitation only)

Only selected researchers get an invitation to a workshop. Participating in these workshops consists in an intense work for few days on the solution of many different problems. The following is the list of the workshops in which I have participated.

Sept, 2020 **Discrete Geometry**, Mathematisches Forschungsinstitut Oberwolfach, 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.

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.

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.

March, 2018 **6th Workshop on Geometry and Graphs**, Bellairs Research Institute, Barbados.

August, 2017 **Fields Workshop on Discrete and Computational Geometry**, Carleton University, Ottawa, Canada.

June, 2017 **CONNECT Workshop on Geometric Networks**, Universitat Politècnica de Catalunya, Barcelona, Spain.

May, 2016 **13th European Research Week on Geometric Graphs**, Universitat Politècnica de Catalunya, Barcelona, Spain.

Conferences attended

May, 2021 **12th International Conference on Algorithms and Complexity**, *Video conference*, University of Cyprus, Larnaka, Cyprus.

April, 2021 **37th European Workshop on Computational Geometry**, *Video conference*, University of St. Petersburg, St. Petersburg, Russia.

January, 2021 **14th Latin American Theoretical Informatics Symposium (LATIN)**, *Video conference*, University of São Paulo, São Paulo, Brazil.

March, 2020 **36th European Workshop on Computational Geometry**, *Video conference*, University of Würzburg, Würzburg, Germany.

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.

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, Budapëst, Hungary.

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.

November, 2017 **The ACM Canadian Celebration of Women in Computing**, Montreal, 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.

July, 2016 **Jornadas de Matematica Discreta y Algoritmica**, 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.

Community service

Program committee **EuroCG21**.

Subreviwer **WADS21, SOSA21, ESA20, EuroCG20, GD19**.

Staff **XVI Spanish Meeting on Computational Geometry**, Universitat Politècnica de Catalunya, Barcelona, Spain.