

Macarena Arenas

CONTACT INFORMATION

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RESEARCH INTERESTS

Geometric group theory, and geometric, combinatorial, and low-dimensional topology.

In particular:

- hyperbolic and non-positively curved groups and spaces,
- the theory of non-positively curved cube complexes and its applications,
- finiteness properties of groups,
- geometric and combinatorial properties of curves on surfaces.

ACADEMIC POSITIONS

Clare College, University of Cambridge

- Denman Baynes Junior Research Fellow (postdoc), current.
- Denman Baynes Senior Student, 2022-2023.

EDUCATION

University of Cambridge

- PhD, Mathematics, July 2023
 - Supervisor: Prof. Henry Wilton
Thesis title: *Cubical small cancellation theory and large-dimensional hyperbolic groups*
- CULP Award in advanced Russian, 2023

McGill University

- M.Sc., Mathematics, June 2020
 - Supervisor: Prof. Daniel T Wise
Thesis title: *A linear isoperimetric function for genus 0 diagrams*

Universidad Nacional Autónoma de México

- B.Sc., Mathematics (*Licenciatura*), April 2018
Graduated with Honours
 - Supervisor: Prof. Max Neumann-Coto
Thesis title: *Medidas de complejidad de curvas en superficies*

RESEARCH PAPERS

1. *The Cohen–Lyndon property, coherence, and immersions* with Henry Wilton, in preparation.
2. *Cubulating Artin groups via small-cancellation* with Alexandre Martin, in preparation.
3. *Cubulating some relatively hyperbolic cubical small-cancellation quotients* with Mahan Mj and Daniel T. Wise, in preparation.
4. *Cubical small-cancellation quotients of non-products* with Kasia Jankiewicz and Daniel T. Wise, submitted.
5. *Asphericity of cubical presentations: the general case*, submitted.
6. *Taut smoothings of arcs and curves* with Max Neumann-Coto, submitted.
7. *The Cohen–Lyndon property in non-metric small-cancellation*, with an appendix written jointly with K. Duda, accepted at **Groups, Geometry & Dynamics**.
8. *Asphericity of cubical presentations: the 2-dimensional case*, **IMRN**.
9. *Hyperbolicity in non-metric cubical small cancellation* with Kasia Jankiewicz and Daniel T. Wise, **Bulletin of the LMS**.
10. *A cubical Rips construction*, **Algebraic & Geometric Topology**.
11. *Linear isoperimetric functions for surfaces in hyperbolic groups* with Daniel T. Wise, submitted.
12. *Measuring complexity of curves on surfaces* with Max Neumann-Coto, **Geometriae Dedicata**.

EXPOSITORY PAPERS

- *Grupos y geometría cubular*, *Memorias de la Sociedad Matemática Mexicana*.
- *Papel Doblado, Geometría y la Conquista del Espacio* accepted at *Universo.Math*.

AWARDS

2024	<i>Vicent Caselles Mathematical Research Award</i> granted by the Royal Spanish Mathematical Society and the BBVA Foundation.
2022	Smith Knight and Rayleigh Knight Prize, group 3.
2016	Second place, Mathematical Essay Competition, <i>Universo.Math</i> magazine.
2015	First place in the “XIII Leamos La Ciencia Para Todos” Competition organized by the Fondo de Cultura Económica, category D.

GRANTS AND SCHOLARSHIPS

2024	Heilbronn Institute for Mathematical Research <i>Small Grants Call</i> funding for a collaboration with Alexandre Martin
2024	ICMS <i>Research in Groups</i> funding for a collaboration with Gil Goffer, Kasia Jankiewicz, Jone Lopez de Gamiz, and Genevieve Walsh
July 2022	LMS Grant for Early Career Researchers
July 2022	LMS Kovalevskaya Grant for the ICM 2022
2020 - 2023	Cambridge International & Newnham College Scholarship
2018 - 2019	Beca Complemento SEP
2015 - 2018	Scholarship student at IMATE-UNAM
2017	Scholarship for the XXVII Summer Research Programme of the Mexican Academy of Sciences
2016 - 2017	Beca de Excelencia Béalos - UNAM Licenciatura
2015 - 2016	Beca de Excelencia Béalos - UNAM Licenciatura

TEACHING, SUPERVISING, AND MARKING

2025	Supervisor, Part IA Groups, University of Cambridge
2024	Supervisor, Part IA Groups, University of Cambridge
2024	Lecturer, Part III Cubulating spaces and groups, University of Cambridge
2023	Supervisor, Part IA Groups, University of Cambridge
2023	Supervisor, Part IB Groups, Rings & Modules, University of Cambridge
2022	Supervisor, Part IA Groups, University of Cambridge
2022	Lecturer, <i>Grupos y Geometría Cubular</i> mini-course, Geometric Group Theory summer school in Morelia, Mexico
2022	Grader, Part III Coxeter Groups, University of Cambridge
2022	Supervisor, Part IB Geometry, University of Cambridge
2021	Supervisor, Part II Algebraic Topology, University of Cambridge
2021	Lecturer, <i>A crash course on isoperimetry</i> mini-course, Geometric group theory without boundaries summer school, online
2021	Supervisor, Part IB Geometry, University of Cambridge
2019	Grader, Topology & Geometry I, McGill University
2019	Teaching Assistant, Algebra I, McGill University
2018	Teaching Assistant, Algebra I, McGill University
2018	Teaching Assistant, Groupoids in Topology, UNAM
2018	Teaching Assistant, Topology I, UNAM
2017	Teaching Assistant, Vector Bundles & K Theory, UNAM

INVITED CONFERENCE TALKS

Nov. 2025	LMS Global Meeting Mumbai, India.
Sept. 2025	LiT III, Pisa, Italy.
Sept. 2025	Actions on graphs and metric spaces workshop, INI, Cambridge, UK.
July 2025	Non-positive curvature and applications workshop, INI, Cambridge, UK.
May 2025	60th Cornell Topology Festival, Ithaca, NY.
April 2025	Geometry at Large ICMAT-IMSA joint Conference, Madrid, Spain.
April 2025	Manifolds and Groups in Bologna III, Bologna, Italy.
Aug. 2024	British Topology Meeting, Aberdeen
July 2024	XXIV Coloquio Latinoamericano de Álgebra, Santiago de Chile, Chile
June 2024	X Dubrovnik Topology Conference, Dubrovnik, Croatia
June 2024	Ian Leary's 60th birthday conference, Bristol, UK
April 2024	Young Geometric Group Theory XII, Bristol, UK
May 2023	Interactions between Geometric group theory and Algebraic topology (BIRS Workshop), Casa Matemática Oaxaca.
May 2023	Geometry of Subgroups conference, Montreal.
April 2023	North British Geometric Group Theory meeting, Glasgow.
Feb. 2023	5-minute lightning talk, Young Geometric Group Theory XI, Munster
Feb. 2023	Groups Topology and Applications Gran Bilbao IV.
Nov. 2022	(Virtual) 3rd International Meeting on Geometric Group Theory and Low Dimensional Topology.
Sept. 2022	Modern Advances in geometric group theory Workshop, Manchester.
Sept. 2022	World of geometric group theory, Zoom.
June 2022	5-minute lightning talk, Hyperbolic groups and their generalisations (conference), IHP, Paris.
Oct. 2021	54th National Congress of the Mexican Mathematical Society, special session in Geometric Group Theory, BUAP, Mexico (online).

INVITED SEMINAR TALKS

Nov. 2025	Séminaire Virtuel Francophone Groupes et Géométrie.
April 2025	Geometric Group Theory and Topology at Tufts Seminar.
April 2025	Bilbao Algebra Seminar.
March 2025	Warwick Geometry & Topology Seminar.
March 2025	Durham Geometry Seminar.
Feb. 2025	London Geometry Seminar, UCL.
Jan 2025	Southampton Pure Mathematics Colloquium.
Jan. 2025	Pisa Geometry Seminar.
Jan. 2025	UCLouvain Group Theory Seminar.
Jan. 2025	Wrocław Geometry Seminar.
Nov. 2024	Bristol Topology Seminar.
Oct. 2024	Geometric Group Theory seminar, Institute for Advanced Study in Mathematics, HIT, China (online).
Oct. 2024	Bonn GGT Oberseminar.
Oct. 2024	Madrid Group Theory Seminar.
May 2024	Toronto Randomness Seminar.
April 2024	Madrid Group Theory Seminar.
Jan 2024	Cambridge DG&T Seminar.
Jan 2024	Birmingham Analysis Seminar.
Dec 2023	Vienna Geometry and Analysis on Groups Seminar.
Dec 2023	Groups and Geometry in the Southeast, Southampton.
Nov 2023	Karlsruhe Topology and Geometric Group Theory seminar.
May 2023	University of Newcastle Algebra Seminar.
April 2023	Oxford Geometric Group Theory Seminar.
Oct. 2022	Topology Seminar at UW-Milwaukee (online).
Oct. 2022	Herriot-Watt algebra, geometry, and topology Seminar.
Oct. 2022	Bristol geometry and topology Seminar.
Sept. 2022	University of Buenos Aires topology seminar (online).
May 2022	Strasbourg Geometry and Topology seminar.
April 2022	Bilbao Algebra seminar.
Feb. 2022	Geometry & Topology Online (GaTO) seminar.
Feb. 2022	Warwick <i>Dynamics and Group Geometry Early Researchers</i> seminar.
Feb. 2021	Seminario a Distancia en Teoría geométrica de grupos, UNAM
Jan. 2021	Queen's University Dynamics, Geometry & Groups Seminar.
Jan. 2021	Oxford Junior Group Theory Seminar.
Nov. 2020	Cambridge Geometric Group Theory Seminar.
Oct. 2020	ENS Paris Group Theory Seminar.
May 2020	Fico González Acuña Low Dimensional Topology Seminar
Sept. 2018	Geometric Group Theory Seminar, McGill University
Oct. 2016	Geometry and Topology Workshop UABJO, Oaxaca.

CONTRIBUTED TALKS

Nov. 2022	Cambridge Junior Geometry Seminar.
March 2022	Topological and Homological Methods in Group Theory 2022.
Feb. 2022	Cambridge Geometric Group Theory Seminar.
Feb. 2022	Cambridge Junior Geometry Seminar.
July 2020	Georgia Tech Topology Students Workshop.
Oct. 2019	McGill Math and Stats Graduate Student Seminar.
Oct. 2018	McGill Math and Stats Graduate Student Seminar.
April 2018	Seminario de Becarios, Imate, UNAM.
Sep. 2017	Seminario de Becarios, Imate, UNAM.

Feb. 2017	Seminario de Becarios, Imate, UNAM.
Oct. 2016	Aquelarre Matemático, UNAM

ACADEMIC VISITS

March 2025	Three-week visit to Montse Casals and Ilya Kazachkov at Bilbao
Jan. 2025	One-week visit to Motiejus Valiunas at the University of Wroclaw
May-June 2024	Visitor/programme participant at the Fields Institute <i>Thematic Program on Randomness and Geometry</i>
April 2024	One-week visit to Andrei Jaikin-Zapirain and Pablo Sanchez Peralta at the ICMAT (Madrid)
Dec. 2023	One-week visit to Chris Cashen at the University of Vienna
April 2023	One-week visit to Rachael Boyd at the University of Glasgow

CONFERENCE ATTENDANCE

Sept 2024	BIRS Workshop on Combinatorial Nonpositive Curvature, Banff Research Station, Canada
June 2024	X Dubrovnik Topology Conference, Dubrovnik, Croatia
June 2024	Ian Leary 60th birthday conference, Bristol
May 2024	6th Meeting of Mexican Mathematicians in the World (online participation)
April 2024	Young Geometric Group Theory XII, Bristol
July 2023	Women in groups, geometry, & dynamics retreat, Idaho, USA
June 2023	Cube Complexes and Combinatorial Geometry, CRM, Montreal
June 2023	Groups around 3-Manifolds, CRM, Montreal
May 2023	BIRS Workshop on the interactions between Geometric group theory and Algebraic topology, Casa Matematica Oaxaca
May 2023	Geometry of Subgroups, CRM, Montreal
Feb. 2022	Young Geometric Group Theory XI, Munster
Feb. 2022	GTA Gran Bilbao IV
Jan. 2023	LMS South West and South Wales Regional Meeting 2023, Southampton
Nov. 2022	(Virtual) 3rd International Meeting on Geometric Group Theory and Low Dimensional Topology
Sep. 2022	Modern advances in geometric group theory, Manchester, UK
April-Jun. 2022	Groups acting on fractals, hyperbolicity and self-similarity, Institut Henri Poincare, Paris, France
March 2022	Topological and Homological Methods in Group Theory, Bielefeld, Germany
Feb. 2022	Workshop on Finiteness Properties, KIT, Karlsruhe, Germany
July 2021	Young Geometric Group Theory X, Newcastle (online)
June 2021	Geometric Group Theory Without Boundaries II, virtual summer school (co-organiser)
Jan. 2021	Postgraduate Group Theory Conference 2020, University of Southampton (via Zoom)
July 2020	Geometric Group Theory Without Boundaries, virtual summer school (co-organiser)
June 2020	Topology Students Workshop, Georgia Tech (via Zoom)
Feb. 2020	Young Geometric Group Theory IX, Saint-Jacut-de-la-Mer, France
Jul. 2019	Aspects of Geometric Group Theory, IHÉS
Jul. 2019	Young Geometric Group Theory VIII, Universidad del País Vasco
May-Jun. 2019	Simons Semester on Geometric and Analytic Group Theory, IMPAN
Aug. 2017	PRIMA Third Congress, Oaxaca, México.
Jul. 2017	Summer School, Centre of Mathematical Sciences UNAM, Morelia.

SERVICE

Referee work for: Duke Math Journal, Journal of the EMS, Algebraic and Geometric Topology, Math. Z., Proceedings of the AMS, Int. J. Math., UKRI.

Reviewer for: zbMATH

Organisational work, mentoring, participation in panels and round-tables, etc:

Sept 2025	Group theory session – Brazil-Mexico Joint Math meeting, co-organiser.
June 2025	Hyperbolicity and Generalizations conference, co-organiser.
May 2025	Summer school: Homological aspects of groups and their classifying spaces, co-organiser.
2024 –	Internationalisation Commission of the Mexican Mathematical Society, member.
2023 –	Cambridge Geometric Group Theory Seminar, organiser.
Fall 2023	<i>Pares Ordenados</i> (Latin-American undergraduate mentorship scheme), mentor.
Oct 2023	<i>Quimera Matemática</i> (conference for Mexican undergraduate students), participated in a panel discussion on pursuing graduate studies abroad.
2022 –2023	Cambridge Women and non-binary mentorship scheme, mentor.
2021 –2023	Cambridge Junior Geometry Seminar, organiser.
June 2021	<i>Geometric Group Theory without Boundaries II</i> Virtual Summer School, co-organiser
July 2020	<i>Geometric Group Theory without Boundaries</i> Virtual Summer School, co-organiser
2018–2020	McGill's Geometric Group Theory Seminar, co-organiser
2016–2018	Students' Seminar, IMATE-UNAM, co-organiser
2017	VII <i>Festival Matemático</i> , volunteer and co-organiser
2017	<i>Jornada Universitaria por la Igualdad 2017</i> (panel discussion on equality and diversity), Mathematics Institute, UNAM, speaker
2016	VI <i>Festival Matemático</i> , volunteer
2015	V <i>Festival Matemático</i> , volunteer.

LANGUAGES

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|-----------------------|------------------------|
| • Spanish (native) | • Russian (conversant) |
| • English (fluent) | • Hebrew (elementary) |
| • French (proficient) | |