

Ana María Botero

Curriculum Vitae

Personal Information

Place of birth Bogotá, Colombia
Contact E-mail: anaboterocarrillo(at)gmail.com

Employments

Since Sept 2018 Postdoctoral researcher at the University of Regensburg, Germany
Apr 2017 - Sept 2017 Postdoctoral researcher at TU Darmstadt, Germany

Visiting Positions

Apr 2022 - Aug 2022 Substitute Professor at the Mathematics department of the University of Heidelberg, Germany

Academic Education

Oct 2013 - Apr 2017 PhD student and member of the research group Arithmetic Geometry at the Humboldt University Berlin (HU Berlin)
Thesis title: *b-divisors on toric and toroidal embeddings*
Advisor: Prof. Dr. J. Kramer
Grade: Summa Cum Laude

Oct 2013 - Dec 2017 Member of the International Research Training Group GRK1800 on Moduli and Automorphic Forms
<http://www.math.hu-berlin.de/~grk1800/index.html>

Oct 2011 - Aug 2013 M.Sc in Mathematics, Free University Berlin (FU Berlin)
Master thesis: *Spherical varieties: some examples*
Advisor: Prof. Dr. K. Altmann, Grade: 1.3 (very good)

Oct 2011 - Apr 2017 Phase I and II of the Berlin Mathematical School
Qualifying Exam, Grade: 1.0 (very good)

Aug 2007 - Jun 2011 B.Sc in Mathematics, University of los Andes, Bogotá, Colombia
Bachelor Thesis: *Combinatorial methods for computing Euler characteristics of toric varieties*
Advisors: B. Uribe and F. Ardila, Grade: Summa Cum Laude

Aug 1996 - Jun 2007 German School Colegio Andino, Bogotá, Colombia

Scholarships

Oct 2013 - Oct 2016 Full Scholarship of the International Research Training Group GRK1800 on Moduli and Automorphic Forms (IRTG)

Oct 2011 - Oct 2013 Full BMS Phase I scholarship

Mathematical Interests

My research interests center around the fields of algebraic, arithmetic, tropical and convex geometry and, in particular, in the way these fields interact. More specifically, I am interested in objects related to toric and toroidal varieties, b-Chow groups, Chern–Weil theory, automorphic forms and their geometric interpretations, Arakelov intersection theory, tropical varieties, tropical intersection theory, convex bodies and Monge–Ampère measures.

Selected Conference and Seminar Talks

- Jan 2022 *Toroidal b -divisors and Monge–Ampère measures*
Algebra-Geometry-Combinatorics Seminar, University of Pittsburgh
- Sept 2021 *Chern–Weil theory for positive singular metrics with an application*
Intercity Seminar on Arakelov Geometry, University of Regensburg
- Jul 2021 *Chern–Weil theory for positive singular metrics*
Algebraic geometry research seminar, Leibniz Universität Hannover
- Jun 2021 *Volumes of moduli spaces and sums of areas of triangles*
EWM summer school on tropical moduli spaces, Institut Mittag-Leffler, Sweden
- Jun 2021 *Harmonic functions on curves*
Arakelov Seminar, Regensburg
- Mar 2021 *Volúmenes de espacios moduli y áreas de triángulos*
Coloquio de Matemáticas, Universidad de los Andes, Bogotá, Colombia
- Jul 2019 *Log varieties over valuation rings*
Arakelov Seminar, Regensburg
- Jun 2019 *The convex set algebra and the b -Chow ring of toric varieties*
Research Seminar in Arithmetic Geometry, HU Berlin
- May 2019 *Special values of zeta functions, volumes of convex sets and volumes of moduli spaces*
Number Theory Seminar, Leiden, Netherlands
- May 2019 *Intersection theory of toric and toroidal b -divisors on toric and toroidal embeddings*
Algebra Research Seminar, Tübingen
- Nov 2018 *Integrability of b -divisors on toroidal embeddings*
Number Theory Seminar, Basel, Switzerland
- Nov 2018 *Integrability of b -divisors on toroidal embeddings*
SFB Lecture, Regensburg
- Feb 2017 *Intersection theory of b -divisors on toroidal varieties*
Third Meeting for Young Women in Mathematics, Freiburg
- Oct 2016 *Intersection theory of b -divisors on toroidal varieties*
TU Darmstadt
- Aug 2016 *Intersection theory of b -divisors on toroidal varieties*
Summer school of the IRTG 1800, Vlieland, Netherlands
- Jul 2016 *Theory of b -divisors on toric varieties*
Contributed talk in the 7th European Congress in Mathematics, TU Berlin
- Jul 2016 *Intersection theory of b -divisors on toric/toroidal varieties*
Research Seminar in Arithmetic Geometry, HU Berlin
- Jun 2016 *Singular metrics, convex bodies and multiple zeta values*
Contributed talk in the CIMPA Summer School: Algebraic, Enumerative and Geometric Combinatorics - ECCO 2016, Universidad de Antioquia and Universidad Nacional sede Medellín, Colombia
- Jan 2016 *b -divisors on toric varieties*
Contributed talk in the Workshop: Asymptotic invariants attached to linear series, Pedagogical University in Cracow, Poland
- Jul 2015 *On the integrability of b -divisors on toric varieties*
Contributed talk in the AMS Summer Research Institute on Algebraic Geometry, University of Utah, Salt Lake City, USA
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Popular Talks

May 2014 *Kryptographie und Elliptische Kurven*
Lange Nacht der Wissenschaften, Berlin

Professional and Teaching Activities

Apr 2022 - Aug 2022 **Riemann Surfaces**, Lecture, University of Heidelberg
Apr 2022 - Aug 2022 **Introduction to tropical geometry**, Seminar, University of Heidelberg
Oct 2021- Mar 2022 **Staatsexamenkurs Algebra**, Lecture, University of Regensburg
May 2021- Mar 2022 Fakultätsrat Mathematik, University of Regensburg
Mar 2019 - Aug 2019 Organizer of Arakelov Oberseminar: Log smoothness and polystability over valuation rings, Regensburg
Jun 2018 Organizer of the Research School: Combinatoric meets Algebra, Geometry and Optimization - ECCO 2018, Barranquilla, Colombia
Jun 2016 Organizer of the CIMPA Research School: Algebraic, Enumerative and Geometric Combinatorics - ECCO 2016, Medellín, Colombia
Mar 2016 - Sep 2016 Proposal for the IRTG 1800 “Moduli and Automorphic forms: Arithmetic and Geometric aspects”, HU Berlin
Mar 2014 - Aug 2014 **Algebra and Number Theory**, Exercise Session, HU Berlin
Feb 2014 Organizer of the BMS Student Conference, Berlin
Feb 2013 Organizer of the BMS Student Conference, Berlin
Year 2013 BMS Student representative, Berlin
Jan 2011 - Jun 2011 **Differential Calculus**, Exercise Session, U. of los Andes, Bogotá
Aug 2010 - Dec 2010 **Differential Calculus**, Exercise Session, U. of los Andes, Bogotá

Skills

Language skills Spanish (native), German (fluent, native level), English (fluent), French (highly proficient), Italian (basic skills)
Computer skills MS Office, Latex, Mathematica, Matlab, Sage, Polymake, Java

Publications

- [1] A. M. Botero, J. I. Burgos Gil, and M. Sombra. “Convex analysis on polyhedral spaces”. *Math. Zeit.* (2021).
- [2] A. M. Botero and J. I. Burgos Gil. “Toroidal b -divisors and Monge–Ampère measures”. *Math. Zeit.* 300 (2021), pp. 579–637. DOI: <https://doi.org/10.1007/s00209-021-02789-5>.
- [3] A. M. Botero. “The Convex-Set Algebra and intersection theory on the Toric Riemann–Zariski Space”. *Acta Math. Sinica, English Series* 38 (2021), pp. 465–486.
- [4] A. M. Botero. “Canonical decomposition of a difference of convex sets”. *J. Algeb. Comb.* 2.4 (2019), pp. 585–602. DOI: 10.5802/alco.55.
- [5] A. M. Botero. “Intersection theory of b -divisors in toric varieties”. *J. Algebr. Geom.* 28.2 (2019), pp. 291–338. DOI: 10.1090/jag/721.
- [6] A. M. Botero. “ b -divisors on toric and toroidal embeddings”. <https://edoc.hu-berlin.de/handle/18452/18811> (2017). PhD thesis.

Preprints

- [1] A. M. Botero, J. I. Burgos Gil, D. Holmes, and R. de Jong. “Chern–Weil and Hilbert–Samuel formulae for singular hermitian line bundles”. Preprint available at <https://arxiv.org/abs/2112.09007>. Submitted.
 - [2] A. M. Botero, J. I. Burgos Gil, D. Holmes, and R. de Jong. “Rings of Siegel-Jacobi forms of bounded relative index are not finitely generated”. Preprint available at <https://arxiv.org/abs/2203.14583>. Submitted.
 - [3] A. M. Botero. “Generalized Minkowski weights and Chow rings of T-varieties”. Preprint available at <https://arxiv.org/abs/2202.03088>. Submitted.
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