

# SANTIAGO ARANGO-PIÑEROS

## *Curriculum Vitae*

(Last updated November 23, 2024)

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Emory University	<a href="mailto:santiago.arango.pineros@gmail.com">santiago.arango.pineros@gmail.com</a>
Department of Mathematics	<a href="mailto:santiago.arango@emory.edu">santiago.arango@emory.edu</a>
Math and Science Center, W431	<a href="https://sarangop1728.github.io">https://sarangop1728.github.io</a>
Atlanta, Georgia, USA	<a href="#">arXiv</a> , <a href="#">MathSciNet</a> , <a href="#">GitHub</a>

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### EDUCATION

- 2020 – Ph.D. Mathematics, Emory University  
Advised by [David Zureick-Brown](#); co-advised by [John Voight](#).
- 2019 M.S. Mathematics, IMPA, Rio de Janeiro, Brazil
- 2017 B.S. Mathematics, Universidad de los Andes, Bogotá, Colombia
- 2017 B.S. Environmental Engineering, Universidad de los Andes, Bogotá, Colombia

### RESEARCH INTERESTS

Broad Number theory and arithmetic algebraic geometry.

Specific Elliptic curves and abelian varieties, Galois representations, Honda–Tate theory, low degree points on curves, modular curves, generalized Fermat equations, stacky curves, arithmetic statistics, computational and algorithmic aspects.

### ARTICLES

4. [Galois groups of low dimensional abelian varieties over finite fields](#), with Sameera Vemullapali and Sam Frengley.
3. [Frobenius distributions of low dimensional abelian varieties over finite fields](#), with Deewang Bhamidipati and Soumya Sankar. *International Mathematics Research Notices*. Vol. 2024, No. 16, pp. 11989-12020, August 2024.
2. [Mertens’ theorem for Chebotarev sets](#), with Daniel Keliher and Christopher Keyes. *International Journal of Number Theory*, Vol. 18, No. 08, pp. 1823-1842, April 2022.
1. [The global field Euler function](#), with Juan Diego Rojas. *Research in the Mathematical Sciences*, Vol. 7, No. 19, September 2020.

## ARTICLES IN PREPARATION

- *Bounds for the relative class number problem for function fields*, with María Chara, Asimina Hamakiotes, Kiran Kedlaya, and Gustavo Rama.
- *Counting 5-isogenies of elliptic curves over the rationals, and minimal integral solutions of  $x^2 + y^2 = z^4$* , with Changho Han, Oana Padurariu, and Sun Woo Park.
- *A stacky proof of the Darmon–Granville theorem*, with Andrew Kobin and David Zureick-Brown. (Expository)
- *Generalized Fermat Equations and Arithmetic Statistics*, my Ph.D. thesis.

## TEACHING

### ARIZONA WINTER SCHOOL

2024 Spring Study Group Leader at [AWS 2024](#)

2023 Fall Problem Set Leader at [PAWS 2023](#)

### EMORY UNIVERSITY, Instructor of Record

Fall Math 111: Calculus I

2022 Fall Math 111: Calculus I

### EMORY UNIVERSITY, Teaching Assistant

Spring Math 116: Calculus for life sciences

2021 Fall Math 221: Linear Algebra

### UNIVERSIDAD DE LOS ANDES, Teaching Assistant

2020 Spring Mate 1203: Cálculo Diferencial

2019 Fall Mate 1203: Cálculo Diferencial

Spring Mate 1207: Cálculo Vectorial

## INVITED SEMINAR TALKS

- 2024 Tufts University, Number theory seminar  
 Boston University, Algebra and number theory seminar  
 Brown University, Algebra seminar  
 Emory University, Algebra and number theory seminar  
 Amherst College, Algebra and number theory seminar  
 Dartmouth College, Algebra and number theory seminar  
 University of Georgia, Athens, Algebra and number theory seminar
- 2023 University of South Carolina, Number theory seminar

## DEPARTMENTAL SERVICE

### EMORY UNIVERSITY

2024 – Algebra and Number Theory Seminar, main organizer

2022 – 2024 Graduate student algebra and number theory seminar, co-organizer

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## REFeree WORK

Sixteenth Algorithmic Number Theory Symposium, Rocky Mountain Journal of Mathematics

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## SELECTED CONFERENCE AND WORKSHOP PARTICIPATION

- 2024    Number theory in the Americas 2, Casa Matemática Oaxaca, Oaxaca, México.  
       XVI Algorithmic Number Theory Symposium. MIT, Boston, MA.  
       The Mordell conjecture 100 years later. MIT, Boston, MA.  
       Hypergeometric motives in the LMFDB. MIT, Boston, MA.  
       Shimura curves in the LMFDB. Dartmouth, Hanover, NH.  
       Arizona Winter School: Abelian Varieties. Tucson, AZ.
- 2023    Palmetto Number Theory Series XXXVII. UGA, Athens, GA.  
       LuCaNT: LMFDB, Computation, and Number Theory. ICERM, Providence, RI.  
       MRC: Explicit computations with stacks. Buffalo, NY.  
       Palmetto Number Theory Series XXXVII. UGA, Athens, GA.  
       Conference in Arithmetic Statistics. CIRM, Marseille, France.  
       Spring school in Arithmetic Statistics. CIRM, Marseille, France.  
       Arizona Winter School: Unlikely Intersections. Tucson, AZ.  
       Introductory Workshop: Diophantine Geometry. MSRI, Berkeley, CA.  
       Connections Workshop: Diophantine Geometry. MSRI, Berkeley, CA.
- 2022    Palmetto Number Theory Series XXXV. U of SC, Columbia, SC.  
       AGNES: Summer school in higher dimensional moduli. Brown, Providence, RI.  
       PCMI: Number theory informed by computation. Park City, UT.  
       CTNT: Connecticut summer school in number theory. UCONN, Storrs, CT.  
       GAGS: Georgia Algebraic Geometry Symposium. Emory, Atlanta, GA.  
       Arizona Winter School: Automorphic forms beyond  $GL_2$ . Tucson, AZ.
- 2021    PCMI: Inverse Galois Problem. Online.

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## EXPOSITORY SEMINAR PRESENTATIONS

I have contributed a number of talks on the graduate student seminars at Emory and IMPA. Here are the titles of some of them:

- The generalized Fermat equations  $x^2 + y^3 = z^n$ . (Emory)
- Belyi's Theorem. (Emory)
- Serre's Open Image Theorem. (Emory)
- Complex Multiplication of Elliptic Curves. (Emory)
- Frobenius Distributions of Abelian Varieties. (Emory)
- Lang's Conjecture. (Unlikely intersections learning seminar at Emory)

- Group Schemes. (Learning seminar on abelian varieties at Emory)
- $\ell$ -adic Representations of Abelian Varieties. (Emory)
- The Winding Quotient. (Learning seminar on Mazur's theorem at Emory)
- The Weil Conjectures. (Emory)
- Moduli of Elliptic Curves. (Learning seminar on modular curves at Emory)
- Modular Curves over  $\mathbf{Q}$ . (Learning seminar on modular curves at Emory)
- Modular Jacobians. (Learning seminar on modular curves at Emory)
- Artin-Schreier Theory. (Emory)
- Schanuel's Theorem. (Emory)
- A Mertens-Chebotarev Theorem. (Emory)
- The Lang-Trotter Conjecture. (Emory)
- Global Field Totients. (Emory)
- Decomposition Groups of Plane Curves. (Master thesis presentation at IMPA)
- Bernoulli Numbers and the Riemann Zeta Function. (IMPA)
- Fermat's Last Theorem for Regular Primes. (IMPA)
- Moduli Spaces of Elliptic Curves. (Undergraduate thesis presentation at Los Andes)

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## SOFTWARE AND DATABASES

2023

*L*-functions and Modular Forms Data Base (LMFDB), <https://www.lmfdb.org>

I have made modest contributions. Most recently:

- I developed the Zigzag pictures for the hypergeometric motives pages. See this [random family](#).
- I updated the Newton polygon pictures for abelian varieties over finite fields, see this [random isogeny class](#).

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## SKILLS

**Language** Spanish (native speaker), English, Portuguese.

**Computer** Python, Magma, SageMath.