Niny Arcila-Maya, PhD

Curriculum Vitae

Contact Information

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Research Interests

Algebraic Topology, Homotopy Theory, Topological Data Analysis, Mathematical Biology

Appointments

Assistant Professor | Member of the Black and Latinx/e Student Success Cohort — Jan 2025
Department of Mathematics, San Francisco State University — *San Francisco, CA*

William W. Elliott Assistant Research Professor — Jan 2022 – Jul 2024
Department of Mathematics, Duke University — *Durham, NC*

Education

Ph.D. in Mathematics — University of British Columbia
Thesis: Decomposition of topological Azumaya algebras in the stable range — *2016 – 2021*
Supervisors: Ben Williams & Alejandro Adem

M.Sc. in Mathematics — Universidad Nacional de Colombia
Thesis: Cohomology of semidirect products — *2014 – 2016*
Supervisor: José Manuel Gómez Guerra

B.Sc. in Mathematics — Universidad Nacional de Colombia
Magna Cum Laude — *2009 – 2013*

Awards, Scholarships & Fellowships

Latinxs and Hispanics in the Mathematical Sciences Honoree - *Lathisms Hispanic Heritage Month Calendar*	2024
Project NExT: Green'23 Cohort - *MAA*	2023 – 2024
President's Academic Excellence Initiative PhD Award - *University of British Columbia*	2020 – 2021
International Tuition Award - *University of British Columbia*	2016 – 2021
Faculty of Science PhD Tuition Award - *University of British Columbia*	2016 – 2020
Itoko Muraoka Fellowship - *St. John's College, Vancouver*	2018
Academic Excellence Scholarship - *Universidad Nacional de Colombia*	2014 – 2016

Publications & Preprints

5. **Decomposition of symplectic vector bundles and Azumaya algebras.** *Arcila-Maya, N. (2023).* Submitted. ArXiv

4. **Decomposition of topological Azumaya algebras with orthogonal involution.** *Arcila-Maya, N. (2022). Accepted for publication after corrections at the Journal of Pure and Applied Algebra.* ArXiv

3. **Compactly supported $\mathbb{A}^1$−Euler characteristic and the Hochschild complex.** *Arcila-Maya N., Bethea C., Opie M., Wickelgren K., Zakharevich I. (2022). Topology and its Applications 316.* DOI

2. **Decomposition of topological Azumaya algebras.** *Arcila-Maya, N. (2021). Canadian Mathematical Bulletin, 1-19.* DOI

1. **Numerical solution of a fractional differential equation Wave-Diffusion.** *Arcila Maya N., Acosta Medina C., and Trujillo Casanova S. (2013). NOOS Journal, Vol. 2, 43 - 48, Universidad Nacional de Colombia, Manizales.*

Talks

At Events

Vines and vineyards to understand ring-like formations within filamentous protein networks — Mar 2024
Invited speaker - AMS 2024 Spring Southeastern Sectional Meeting — *Florida State University*

Topological Azumaya algebras and the decomposition problem — Apr 2023
Invited speaker - AMS 2023 Spring Central Sectional Meeting — *University of Cincinnati*

Decomposition of topological Azumaya algebras in the stable range — Aug 2022
Invited speaker - AT and TDA: A Conference in Honor of Gunnar Carlsson — *University of Minnesota*

Entendiendo álgebras topológicas de Azumaya — Jun 2021
Invited speaker - I Encuentro de Estudiantes y Egresados de Matemáticas — *Universidad Nacional de Colombia*

Decomposition of topological Azumaya algebras with involution — Dec 2020
Invited speaker - CMS Winter Meeting 2020 - Homotopy Theory Session — *Montreal, Canada*

Decomposition of Azumaya algebras — May 2020
Invited speaker - Topology, Coast to Coast — *University of British Columbia*

Decomposition of topological Azumaya algebras — Dec 2019
Invited speaker - CMS Winter Meeting 2019 - Topology Session — *Toronto, Canada*

Integral cohomology of BPU_n and the understanding of topological Azumaya algebras — Mar 2019
Invited speaker - Women in Homotopy Theory and Algebraic Geometry II — *Freie Universität*

At Seminars

Decomposition problem for topological Azumaya algebras with an involution of the first kind — Apr 2023
Invited speaker - Topology Seminar — *University of Virginia*

Decomposition problem for topological Azumaya algebras with an involution of the first kind — Apr 2023
Invited speaker - Topology Seminar — *John Hopkins University*

Algebras topológicas de Azumaya y el problema de descomposición — Apr 2023
Invited speaker - Seminario de Topología Algebraica y Geometría — *Virtual*

Topological Azumaya algebras and the decomposition problem — Apr 2023
Invited speaker - Homotopy Theory Seminar — *University of Pennsylvania*

Decomposition of topological Azumaya algebras in the stable range — Apr 2022
Invited speaker - Peripatetic Seminar — *University of Calgary*

Decomposition of topological Azumaya algebras with symplectic involution — Mar 2022
Geometry & Topology Seminar — *Duke University*

Decomposition of topological Azumaya algebras — Oct 2020
Invited speaker - Topology Seminar — *University of Illinois Urbana-Champaign*

Cohomology Operations — Fall 2019
QTOP Math - Series: Stable homotopy theory — *University of British Columbia*

What is a topological Azumaya algebra? — Spring 2019
Reading Seminar - Series: Power Operations & Miscellaneous — *University of British Columbia*

Workshops Attended

Climate Science at the Interface Between Topological Data Analysis and Dynamical Systems Theory - — Jul 2024
AMS - Mathematics Research Community

Algebraic K-theory and Brauer Groups - *Banff International Research Station* — Jun 2024

Representation of Codes Using Group Algebras - *Rethinking Number Theory* — Jun 2023

VSU CBMS Conference on Topological Data Analysis and Persistence Theory - *Valdosta State University* — Aug 2022

Motivic Homotopy: Interactions and Applications - *IAS Park City Mathematics Institute* — Jul 2021

Cohomology of Finite Groups: Interactions and Aplications - *Research Institute for Mathematics: MFO* — Aug 2020

Women in Topology III - *Hausdorff Research Institute for Mathematics: HIM* — Aug 2019

Workshop Women in Topology - *Mathematical Sciences Research Institute: MSRI* — Nov 2017

Teaching Experience

Math 105L: Laboratory Calculus and Functions I
Instructor - One section
Spring 2024
Department of Mathematics - Duke University

Math 611: Algebraic Topology I
Instructor - One section
Fall 2023
Department of Mathematics - Duke University

Math 218D2: Vectors and Matrices
Discussion facilitator - Four sections
Spring 2023
Department of Mathematics - Duke University

Math 401/701: Introduction to Abstract Algebra
Instructor - One section
Fall 2022
Department of Mathematics - Duke University

Math 112L: Laboratory Calculus II - Online
Instructor - One section
Summer 2022
Department of Mathematics - Duke University

Math 112L: Laboratory Calculus II
Instructor - Two sections
Spring 2022
Department of Mathematics - Duke University

Math 152: Linear Systems - Online
Instructor - One section
Spring 2021
Department of Mathematics - University of British Columbia

Head TA of the Mathematics Learning Center (MLC)
40 to 60 graduate and undergraduate TAs
2019–2020
Department of Mathematics - University of British Columbia

Mathematical Logic
Instructor - One section
Fall 2013
Department of Mechatronics Engineering - Universidad de Caldas

In what follows, all items marked with a star (★) are activities related to Justice, Equity, Diversity and Inclusion.

Mentoring Experience

★ **AWM - Mentoring Network**
Summer 2023 – Present
MENTORED A GRADUATE STUDENT: *Dhanusshya Raghu*
Ramanujan Institute for Advanced Study in Mathematics
Mentors are paired with undergraduate students to meet monthly to discuss career goals, resources, and build community.

Summer Project
Summer 2023
MENTORED A MATHEMATICS UNDERGRADUATE STUDENT
Duke University
Festus Akinsola - An introduction to vines and vineyards

Math 491: Non-research Independent Study
Spring 2023
MENTORED TWO MATHEMATICS AND COMPUTER SCIENCE UNDERGRADUATE STUDENTS
Duke University
Ryan Iki and Mark Rekutin - An introduction to topological data analysis

★ **Twoples - Online Directed Reading Program**
Spring 2022
MENTORED A MATHEMATICS UNDERGRADUATE STUDENT
University of Alaska Southeast
Alice Mehalek - Group actions, Sylow theorems, and modules

Professional Service

★ **Founder and Co-organizer - Pares Ordenados: Online DRP in Spanish**
Spring 2023 – Present
Free mentorship program serving Spanish-speaking math undergraduate students in Latin America *Worldwide Community*

★ **Member of the Duke Math DEI team**
Fall 2023 - Spring 2024
Department of Mathematics
Duke University

★ **Member of the Prison Engagement Initiave Network**
Fall 2023
MEMBER OF THE IN-PRISON EDUCATION TASK FORCE - *The Kenan Institute for Ethics*
Duke University
Interdisciplinary Duke University network committed to engaging prisons, the people affected by prisons, and the politics and pathways surrounding mass incarceration.

PROFESSIONAL DEVELOPMENT

TEACHING & MENTORING TRAINING

⭐ **Cultivating an Inclusive Teaching & Learning Community through Narrative Change**   Duke University
Center for Truth, Racial Healing & Transformation (TRHT)   *Nov 8, 2023*
Workshop: 1 hour

Best Practices in Mentoring   Duke University
Duke Graduate Academy   *Summer 2023*
Workshop: 6 sessions of 75 minutes each

Instructional Skills Workshop   University of British Columbia
Centre for Teaching, Learning and Technology (CTLT)   *Spring 2021*
Workshop: 3 sessions of 4 hours each

Transitioning to Online Teaching: A Blended Approach   University of British Columbia
Centre for Teaching, Learning and Technology (CTLT)   *Summer 2020*
Workshop: 12 hours

Foundations of Pedagogy   University of British Columbia
Centre for the Integration of Research, Teaching, and Learning (CIRTL)   *Fall 2019*
Workshop: 8 sessions of 2 hours each

DEI TRAINING & EVENTS ATTENDED

⭐ **Neurodiversity Student Panel - Duke Neurodiversity Connections**   Duke University
Personal experience from neurodivergent students - Practical advice for teaching and mentoring   *Sep 26, 2023*

⭐ **Bystander Training - Kenan Institute for Ethics**   Duke University
Workshop: 3 hours   *Summer 2023*

⭐ **Mathematics for Human Flourishing**   Duke University
Talk by Professor Francis Su   *December 2022*

PROJECT NEXT

Professional development program for early career mathematicians focusing on enhancing math education, promoting inclusivity, and guiding early career faculty in research, scholarship, and service.

⭐ **Engaging Students Meaningfully with Proof**   Tampa, Florida
Workshop: 80 minutes   *Summer 2023*

⭐ **Creating a Vibrant & Inclusive Community**   Tampa, Florida
Workshop: 80 minutes   *Summer 2023*

Helping Students Value Learning Outcomes over Grades   Tampa, Florida
Workshop: 80 minutes   *Summer 2023*

Developing and Establishing Modeling/Computational Courses   Tampa, Florida
Workshop: 80 minutes   *Summer 2023*

Charting your Career Course   Tampa, Florida
Workshop: 80 minutes   *Summer 2023*

Jumpstarting Your Scholarship   Tampa, Florida
Workshop: 2 sessions of 2 hours each   *Summer 2023*

MISCELLANEOUS

Science & Research Communication - Duke Graduate Academy   Duke University
Workshop: 6 sessions of 2 hours each   *Summer 2023*

Generational differences in the workplace: Fact or Fiction - Alumni UBC   University of British Columbia
Webinar: 1 hour   *Spring 2019*

Presentation Skills I - MITACS   University of British Columbia
Workshop: 8 hours   *Spring 2019*

Skills of Communication - MITACS   University of British Columbia
Workshop: 8 hours   *Spring 2017*

Outreach

★ FEMMES+ Capstone 2023   Duke University
Led an activity together with two of my students   *Apr 2023*

★ Festival of Numbers   Red Matemática Antioquia
Facilitated recreational activities with children and teenagers   *Aug 2015*

Youth Math Contest   Universidad Nacional de Colombia
Made a digital solution manual for the contest   *Fall 2013*

Professional Affiliations

AWM	:	Association for Women in Math
MAA	:	Mathematical Association of America
SACNAS	:	Society for Advancement of Chicanos/Hispanics & Native Americans in Science

Technical Skills

Data Analysis	:	Python, Jupyter, GitHub
Other	:	LaTeX, Microsoft Office, HTML

Languages

English	:	Fluent
Spanish	:	Native