Alejandro Bravo-Doddoli
Curriculum Vitæ[1]

Department of Mathematics
University of Michigan, Ann Arbor, MI 48109
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Education

University of California Santa Cruz, Ph.D in Mathematics Science — 2023
- Advisor: Richard Montgomery.
- Thesis: Metric Lines in Metabelian Carnot Groups.

National Autonomous University of Mexico, M.S. Mathematics Science — 2016
- Advisor: Luís García Naranjo.
- Thesis: The Dynamics of an Articulated n-trailer Vehicle

National Autonomous University of Mexico, B.S. Mathematics Science — 2014
- Advisor: Oscar Alfredo Palmas Velasco.
- Thesis: Hodge Theory in Real and Complex Manifolds

Employment

- Postdoctoral Assistant Professor, University of Michigan, U.S. — 08/2023 - Present
- Graduate Teaching Assistant, University of California Santa Cruz, U.S. — 09/2017 - 06/2023
- Assistant Lecturer, National Autonomous University of Mexico, Mexico. — 08/2016 - 06/2017
- Graduate Student Instructor, National Autonomous University of Mexico, Mexico. — 08/2014 - 06/2016
- Undergraduate Teaching Assistant, National Autonomous University of Mexico, Mexico. — 08/2012 - 06/2014

Fellowships and Awards

B. Alan Taylor Outstanding Postdoctoral Assistant Professor Teaching Award in Mathematics, Department of Mathematics, University of Michigan, 2024-2025 academic year. — 2025

Conacyt, Mexico, Scholarships, fellowship to pursue PhD abroad. — 2017-2021

Incentive Program for Productivity and Performance of lecture staff, National Autonomous University of Mexico, in academic year 2016-2017. — 2017

Incentive Program for Productivity and Performance of lecture staff, National Autonomous University of Mexico, in academic year 2015-2016. — 2016

Honorific Mention, Medalla Sotero Prieto, Mexican Mathematical Society, Best B.S. Thesis in academic year 2013-2014. — 2014

Conacyt, Mexico, Scholarships, Fellowship to Pursue a High-Quality National Master's Degree. — 2014-2016

Peer Reviewer for

Russian Journal of Nonlinear Dynamics, Regular and Chaotic Dynamics, Calculus of Variations and Partial Differential Equations. — 2025

Published Papers

1.- Integrable Sub-Riemannian Geodesic Flow on the Orthogonal Group — 2024

Bravo-Doddoli A., Arathoon P., Bloch A.M.— Nonlinearity 38.11 (Nov. 2025), p. 115007.

[1] Updated January 15th, 2026.

https://doi.org/10.1088/1361-6544/ae19c0

2.- Metric Lines in the Special Euclidean Group on the Plane 2024

Wang Y., Ku S., Bravo-Doddoli A.— Involve, a Journal of Mathematics (in press).

3.- Metric Lines in Jet Space 2024

Bravo-Doddoli A.— Analysis and Geometry in Metric Spaces. Vol. 12, no. 1 pp. 6101 – 6111.
https://doi.org/10.1515/agms-2024-0016

4.- Symplectic Reduction of the Sub-Riemannian Geodesic Flow for Metabelian Nilpotent Groups 2024

Bravo-Doddoli A., Le Donne E., Paddeu N.— Geometric Mechanics. Vol. 01, No. 01, 2450002.
https://doi.org/10.1142/S2972458924500023

5.- Chaotic sub-Riemannian geodesic flow on $J^2(\mathbb{R}^2, \mathbb{R})$ 2023

Bravo-Doddoli A.— Regular and Chaotic Dynamics. Vol. 28, pp 835–840.
https://doi.org/10.1134/S1560354723060023

6.- No periodic geodesics in the Jet space 2023

Bravo-Doddoli A.— Pacific Journal of Mathematics. Vol. 322, No. 1.
https://doi.org/10.48550/arXiv.2203.16178

7.- Geodesics in the Jet Space 2022

Bravo-Doddoli A.— Montgomery R., Regular and Chaotic Dynamics. 27:2, 151–182.
https://doi.org/10.1134/S1560354722020034

8.- Higher Elastica: Geodesics in Jet Space 2022

Bravo-Doddoli A.— European Journal of Mathematics. Vol. 8, pages 1377–1391.
https://doi.org/10.1007/s40879-022-00574-0

9.- The motion of an articulated n-trailer vehicle 2015

Bravo-Doddoli A.— García-Naranjo L. C., Regular and Chaotic Dynamics. 20, 497–517.
https://doi.org/10.1134/S1560354715050019

Preprints

1.- Metric Lines in Engel-Type Group 2025

Bravo-Doddoli A.— arXiv:2405.08186.
https://doi.org/10.48550/arXiv.2405.08186

2.- Abelian instances of nonabelian symplectic reduction 2025

Bravo-Doddoli A., García-Naranjo L. C., Rigato E.— arXiv.2510.20006.
https://doi.org/10.48550/arXiv.2510.20006

3.- Metric Lines in the Space of Curves 2025

D. Catalá, M. Vollmayr-Lee, and A. Bravo-Doddoli.—arXiv.2510.20065.
https://arxiv.org/abs/2511.21065

Invited Talks

Integrable Sub-Riemannian Geodesic Flow in the Engel-type Group, 8th Conference on Finite Dimensional Integrable Systems in Geometry and Mathematical Physics, the Mathematics Research Center CIMAT, Guanajuato, Mexico. 2025

Metric Lines in the Jet Space, Joint Mathematics Meeting. San Francisco, U.S. 2024

The Persistence of Periodic Orbits on Monster Tower or n-trailer System, Americas Conference on Differential Equations and Nonlinear Analysis, the Mathematics Research Center, CIMAT, Guanajuato, Mexico. 2019

The Dynamics of an Articulated n-trailer Vehicle, Workshop on Nash Blow-up and the semple tower, II-Sciencesconf.org, University Leuven. Belgium. 2019

Selected (contributed) Talks

Symplectic Reduction of the Sub-Riemannian Geodesic Flow for Metabelian Carnot Groups, Spring Western Sectional Meeting, American Mathematical Society, Fresno 2023

State University, U.S.

The Dynamics of an Articulated n-trailer Vehicle, XLIX National Congress of the Mexican Mathematical Society, University of Aguascalientes, Mexico. 2016

Hodge Theory in Real and Complex Manifolds, XLIVIII National Congress of the Mexican Mathematical Society, University of Sonora, Mexico. 2015

Posters

Integrable Sub-Riemannian Geodesic Flow in the Engel-type Group, 8th Conference on Finite Dimensional Integrable Systems in Geometry and Mathematical Physics, the Mathematics Research Center CIMAT, Guanajuato, Mexico. 2025

Integrable Sub-Riemannian Geodesic Flow on the Orthogonal Group, Frontiers in Sub-Riemannian Geometry, Frontiers in Sub-Riemannian Geometry, The Centre International de Rencontres Mathématiques CIRM, Marseille, France. 2024

Metric Lines in Jet Space, Frontiers in Sub-Riemannian Geometry, Frontiers in Sub-Riemannian Geometry, The Centre International de Rencontres Mathématiques, CIRM, Marseille,France. 2024

Symplectic Reduction of the Sub-Riemannian Geodesic Flow for Metabelian Carnot Groups, Geometry and Control In Cortona. Palazzone di Cortona, Cortona, Italy. 2023

The Dynamics of an Articulated n-trailer Vehicle, Sub-Riemannian Geometry and Beyond II. University of Jyväskylä, Finland. 2019

The Dynamics of an Articulated n-trailer Vehicle, Iberoamerican Meeting on Geometry, Mechanics and Control. Mathematics Research Center CIMAT, Guanajuato, Mexico. 2018

The Dynamics of an Articulated n-trailer Vehicle, 10th ICMAT International GMC Summer School on Symplectic Geometry, Classical Mechanics and Interactions with Spectral Theory, La Cristalera, Miraflores de la Sierra, Spain. 2016

Dynamics of a one-trailer Hilare Robot 9th ICMAT International GMC Summer School on Symplectic Geometry, Classical Mechanics and Interactions with Spectral Theory, La Cristalera, Miraflores de la Sierra, Spain. 2015

Visits International Research Centers

University of Padova, Italy (1 Week). 2025

University of Fribourg, Switzerland (2 Weeks). 2022

MSRI: Hamiltonian Systems, from Topology to Applications through Analysis, Berkeley (2 Weeks). 2018

Seminar Talks

- 2021-Present: Department of Mathematics, University of Fribourg, Mathematical Physics Dipartimento di Matematica "Tullio Levi-Civita", University of Padua, Italy, Mathematics Department UCSC, Dialogos Virtuales de Analisis and Geometria, Ciencias-Faculty-UNAM (Online), Geometric Theory of Optimal Control, Moscow (online), Department of Mathematics, George Mason University, Ohio State University, Urban-Chapamaing University, Illinois.
- 2016-2020: IM-UNAM, Mexico City, Mexico, IIMAS-UNAM, Mexico City, Mexico, Mathematics Department UCSC (3 times), TV Ciencias, Ciencias-Faculty-UNAM (Online).

Seminar Organisation

Director, Lab Geometry[2] (LoG(M) Project)— Mathematics Department, University of Michigan. 8/2024-Present

Organizer, Graduate Student Seminar— Mathematics Department, University of California, Santa Cruz. 9/2022-06/2023

Teaching Record

- Courses given at the University of Michigan, in the period 2023-Present:
  - Introduction to Differential Geometry (Math 433). Third and Fourth years of various Bachelor Programmes.
    Winter 2026: 48 Hours
  - Ordinary Differential Equations with Proofs (Math 316). Third and Fourth years of various Bachelor Programmes.
    Winter 2025: 48 Hours
    Fall 2024: 48 Hours
    Spring 2024: 48 Hours
    Winter 2024: 48 Hours
  - Geometry Lab (Math 440). Third and Fourth years of various Bachelor Programmes.
    Winter 2026: 48 Hours
    Fall 2025: 48 Hours
    Winter 2025: 48 Hours
    Fall 2024: 48 Hours
  - Integral Calculus (Math 116). First year of various Bachelor Programmes.
    Fall 2025: 126 Hours
    Fall 2023: 126 Hours
- Teaching assistant at the University of California, Santa Cruz, in the period 2017-2023:
  - Complex Analysis (Math 103A). Fourth year of the Mathematics Bachelor Programmes.
    Spring 2023: 20 Hours
  - Integral Calculus (Math 19B). First year of various Bachelor Programmes.
    Winter 2023: 40 Hours
    Fall 2022: 40 Hours
    Summer 2022: 20 Hours
    Spring 2021: 40 Hours
    Fall 2019: 40 Hours
  - Differential Calculus (Math 19A). First year of various Bachelor Programmes.
    Spring 2022: 40 Hours
    Fall 2018: 40 Hours
  - Calculus with Applications (Math 11). First year of various Bachelor Programmes.
    Winter 2022: 40 Hours
    Winter 2020: 40 Hours
    Spring 2018: 40 Hours
  - PreCalculus (Math 3). First year of various Bachelor Programmes.
    Fall 2021: 40 Hours
    Winter 2019: 40 Hours
  - Linear Algebra (Math 21). Second and third years of various Bachelor Programmes.
    Fall 2020: 40 Hours
    Summer 2019: 20 Hours.
  - Ordinary Differential Equations (Math 24). Second and third years of various Bachelor Programmes.
    Summer 2020: 20 Hours
  - Vector Calculus with Applications (23A). Second and third years of various Bachelor Programmes.
    Fall 2018: 40 Hours
- Courses given at the Autonomous University of Mexico, in the period 2014-2017:
  - Abstract Algebra. First year of the Physics Bachelor Programmes.
    Winter 2015: 48 Hours
    Fall 2014: 48 Hours
  - Analytic Geometry. First year of various Bachelor Programmes.
    Fall 2015: 48 Hours

[2] Official website: https://lsa.umich.edu/math/undergraduates/research-and-career-opportunities/research/LoGM.html

  - Differential Calculus. First year of the Biology Bachelor Programmes.
    Winter 2017: 126 Hours
    Winter 2016: 126 Hours
  - Integral Calculus. First year of the Biology Bachelor Programmes.
    Fall 2016: 126 Hours
- Teaching assistant at the Autonomous University of Mexico, in the period 2013-2014:
  - Abstract Algebra. First year of Physics Bachelor Programme.
    Fall 2013: 24 Hours
  - Multivariable Calculus. Second year of various Bachelor Programmes.
    Winter 2013: 48 Hours

Mentorship

- Independent Study: Irrationality of infinite multiplication with Yoshihiro Paris.
- Independent Study: Optimal synthesis on the special linear group with Tsz Chun Lau.
- Research Experience Undergraduate[3] Summer 2025.
- LoG(M) Project Fall 2024.
- Research Experience Undergraduate Summer 2024.
- LoG(M) Project Winter 2024.
- LoG(M) Project Fall 2023.

Certifications

Rackham Professional Development Diversity, Equity, and Inclusion Certificate. 2025
Rackham Graduate School, University of Michigan.
Preparing for Inclusive Teaching. 2021
Center for Innovations in Teaching and Learning, University of California, Santa Cruz.
Preparing for Inclusive Teaching. 2020
Center for Innovations in Teaching and Learning, University of California, Santa Cruz.
Preparing for Inclusive Teaching. 2018
Center for Innovations in Teaching and Learning, University of California, Santa Cruz.
Preparing for Inclusive Teaching. 2017
Center for Innovations in Teaching and Learning, University of California, Santa Cruz.

Languages

Fluent in English and Spanish (mother tongue). Beginner in French and Italian. 2022

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Alejandro Bravo Doddoli
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[3]Official website: https://lsa.umich.edu/math/undergraduates/research-and-career-opportunities/research/research-experience-for-undergraduates–reu-.html