

LEONARDO ENRIQUE ABBRESCIA

CURRICULUM VITÆ

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Personal Information

PLACE AND DATE OF BIRTH: Bogotá, Colombia | April 16, 1993
CITIZENSHIP: Colombia, U.S.A.
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Research Interests

My research integrates analytic and geometric techniques to study evolutionary partial differential equations. More specifically, I am currently focused on analyzing shock singularities in compressible fluids. I am also interested in global/finite-in-time existence properties to equations that model wave-like phenomena (i.e. relativistic membranes).

Appointments

UPCOMING NSF Postdoctoral Fellow (to begin in August 2020)
Vanderbilt University, Nashville, TN
Postdoc mentor: Jared Speck

Education

PRESENT Ph.D. Candidate in MATHEMATICS (expected May 2020)
Michigan State University, East Lansing, MI
Advisor: Willie W.Y. Wong
Dissertation: The vector field method and its applications to nonlinear evolution equations
JUNE 2015 B.S. in APPLIED MATHEMATICS
Columbia University, New York, NY
Advisors: Daniela De Silva, Ovidiu Savin

Papers and Preprints

Preprints:

- L. Abbrescia, W. Wong. Global nearly-plane-symmetric solutions to the membrane equation. arXiv:1903.03553. *Accepted for publication at Forum of Mathematics, Pi*, 2020.
- L. Abbrescia, J. Speck. Remarkable localized integral identities for 3D compressible Euler flow and the double-null framework. arXiv:2003.02815. *Submitted*, 2020.
- L. Abbrescia, W. Wong. Geometric analysis of 1+1 dimensional quasilinear wave equations. arXiv:1912.04692, *Submitted*, 2019.
- L. Abbrescia, Y. Chen. Global stability of some totally geodesic wave maps. arXiv:1907.07226. *Submitted*, 2019.

- L. Abbrescia, W. Wong. Global versions of Gagliardo-Nirenberg-Sobolev inequality and applications to wave and Klein-Gordon equations. arXiv:1903.12129. *Submitted*, 2019.

Published Research Articles:

- [1] L. Abbrescia, I. Huq-Kuruvilla, J. Nelson, and N. Sultani. Reeb dynamics of the link of the A_n singularity. *Involve, a Journal of Mathematics*, 10(3):417–442, 2017.

Scholarships and Awards

- Dr. William L. Harkness Endowed Fellowship, Michigan State University, 2020
- US National Science Foundation Graduate Research Fellowship, 2015 -
- Student Travel Grant, American Mathematical Society, 2019
- Herbert T. Graham Scholarship Award, Michigan State University, 2017
- Math Department Fellowship, Michigan State University, 2015 - 2016
- University Fellowship, Michigan State University, 2015 - 2016
- College Fellowship, College of Natural Science, Michigan State University, 2015 - 2016
- Quest Scholar, Columbia University, 2011 - 2015

Workshops

Workshops Attended (or to attend):

- *Nonlinear dispersive PDE, quantum many particle systems and the world between*, MSRI and INdAM and MSI, Cortona, Italy, 2017.
- *Dynamics of the energy critical wave equations*, University of North Carolina at Chapel Hill, Chapel Hill, NC, 2017.
- *Madison Workshop in Analysis and PDE*, University of Wisconsin—Madison, Madison, WI, 2017.
- *Boston City Limits Summer School on the Geometric Analysis of Waves and Fluids*, Massachusetts Institute of Technology, Cambridge, MA, 2016.
- *Calculus of Variations and Nonlinear Partial Differential Equations*, Columbia University, New York, NY, 2016.

Conferences and Seminars

Conferences Organized:

- *Graduate Student Topology and Geometry Conference*, Michigan State University, East Lansing, MI, 2017. (with W. Chen, H. Gakhar, M. Hedden, and A. Mallick.)

Conference Talks:

- *Global stability of some totally geodesic maps*, Special Session on Wave Phenomena in Fluids and Relativity, AMS Sectional, University of Wisconsin-Madison, Madison, WI, 2019.
- *L^p type decay estimates for wave and Klein-Gordon equations*, Ohio River Analysis Meeting 9, University of Cincinnati, Cincinnati, OH, 2019. (Funded).
- *Global large data solutions of the membrane equation*, Great Lakes Mathematical Physics Meeting, Michigan State University, East Lansing, MI, 2018.
- *Reeb dynamics of Lens spaces*, Summer Undergraduate Math research at Yale, Yale University, New Haven, CT, 2014. (Funded.)

Conferences Attended (or to attend):

- *Southern California Analysis and PDE Conference*, UC San Diego, La Jolla, CA, 2019.
- *Conference on Nonlinear Partial Differential Equations and Application*, University of Michigan, Ann Arbor, MI, 2019.
- *Rivière-Fabes Symposium*, University of Minnesota, Minneapolis, MN, 2019.
- *Ohio River Analysis Meeting 9*, University of Cincinnati, Cincinnati, OH, 2019.
- *Great Lakes Mathematical Physics Meeting*, Michigan State University, East Lansing, MI, 2018.
- *Great Lakes Mathematical Physics Meeting*, Michigan State University, East Lansing, MI, 2017.
- *Graduate Student Topology and Geometry Conference*, Michigan State University, East Lansing, MI, 2017.
- *Graduate Student Topology and Geometry Conference*, Indiana University Bloomington, Bloomington, IN, 2016.
- *Calculus of Variations and Nonlinear Partial Differential Equations*, Columbia University, New York, NY, 2016.
- *Great Lakes Mathematical Physics Meeting*, Michigan State University, East Lansing, MI, 2016.
- *76th Midwest PDE Seminar*, Michigan State University, East Lansing, MI, 2015.
- *Simons Collaboration on Homological Mirror Symmetry*, University of Pennsylvania, Philadelphia, PA, 2015.

Seminars Organized:

- *Student PDE Seminar*, Michigan State University, East Lansing, 2017 -

Seminar Talks:

- *Geometric analysis of 1 + 1 dimensional quasilinear waves*, PDE seminar, Vanderbilt University, TN, 2020.
- *Geometric analysis of 1 + 1 dimensional quasilinear waves*, Student PDE seminar, Michigan State University, MI, 2020.
- *Traveling wave solutions to the relativistic membrane equation*, Analysis and PDE seminar, Michigan State University, MI, 2019.
- *Parabolic Moser iteration*, Informal geometric analysis seminar, Michigan State University, MI, 2019.
- *Local and global existence of L^2 solutions to the KdV equation*, Student PDE seminar, Michigan State University, MI, 2017.
- *Global existence for minimal surfaces on Minkowski space*, Student PDE seminar, Michigan State University, MI, 2017.
- *Dirac operators on spinors*, Informal geometric analysis seminar, Michigan State University, MI, 2017.
- *An introduction to spinors*, Informal geometric analysis seminar, Michigan State University, MI, 2017.
- *Regularity for minimal surfaces of codimension 1*, Student Analysis and PDE seminar, Michigan State University, MI, 2016.
- *Sum of four squares*, Student Analysis and PDE Seminar, Michigan State University, MI, 2016.
- *A survey of elliptic PDE*, Student Analysis and PDE Seminar, Michigan State University, MI, 2016.

Service

- AMS Student Chapter vice-president, Michigan State University, 2019 - 2020
- AMS Student Chapter president and founder, Michigan State University, 2018 - 2019
- Graduate student representative on the mathematics library committee, Michigan State University, 2018 -
- Department of mathematics representative on the graduate student council, Michigan State University, 2017-2018

Teaching Experience

Michigan State University:

Instructor

Fall 2018 MTH 124 Survey of Calculus (two sections)

Recitation instructor

Spring 2019 MTH 133 Calculus II (three sections)

Columbia University

Teaching Assistant

Spring 2015 Fourier Analysis

Spring 2015 Partial Differential Equations

Fall 2014 Calculus III

Spring 2014 Partial Differential Equations

City College of New York

Teaching Assistant

Summer 2013 Pre-Calculus

Summer 2012 Advanced Algebra

Languages

ENGLISH: Fluent

SPANISH: Fluent

ITALIAN: Basic Knowledge

Computer Skills

Basic Knowledge: MATLAB, MATHEMATICA

Advanced Knowledge: L^AT_EX

References

- Willie W.Y. Wong Assistant Professor of MATHEMATICS
Michigan State University
wongwwy@math.msu.edu
- Jared Speck Associate Professor of MATHEMATICS
Vanderbilt University
jared.speck@vanderbilt.edu
- Jonathan Luk Associate Professor of MATHEMATICS
Stanford University
jluk@stanford.edu
- Jun Kitagawa Assistant Professor of MATHEMATICS
Michigan State University
kitagawa@math.msu.edu