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 work on studying the stability properties to equations that model wave-like phenomena (i.e. relativistic membranes). I am very interested in learning more about mathematical relativity!

Appointments

Present	NSF Postdoctoral Fellow **Vanderbilt University**, Nashville, TN Postdoc mentor: Jared Speck

Education

August 2020	Ph.D. in Mathematics **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, J. Speck. The emergence of the Cauchy Horizon from the crease in 3D compressible Euler flow. *In preparation*
- H. Soto, L. Abbrescia, A. Castillo, L. Colmenarejo, A. Sanchez, R. Uscanga. The Geometry of the Cauchy-Riemann Equations: A Marriage of Embodied, Symbolic, and Formal Interpretations. *Submitted, available upon request*, 2022
- L. Abbrescia, J. Speck. The emergence of the singular boundary from the crease in 3D compressible Euler flow. arXiv:2207.07107. *Submitted*, 2022
- L. Abbrescia, J. Speck. Remarkable localized integral identities for 3D compressible Euler flow and the double-null framework. arXiv:2003.02815. *Submitted*, 2022.
- L. Abbrescia, W. Wong. Geometric analysis of $1+1$ dimensional quasilinear wave equations. arXiv:1912.04692, *Submitted*, 2019.

Refereed Research Articles:

[4] Leonardo Enrique Abbrescia and Yuan Chen. Global stability of some totally geodesic wave maps. *Journal of Differential Equations*, 284:219–252, 2021.

[3] Leonardo Enrique Abbrescia and Willie Wai Yeung Wong. Global versions of gagliardo-nirenberg-sobolev inequality and applications to wave and klein-gordon equations. *Transactions of the American Mathematical Society*, 374:773–802, 2021.

[2] Leonardo Abbrescia and Willie Wai Yeung Wong. Global nearly-plane-symmetric solutions to the membrane equation. *Forum of Mathematics, Pi*, 8, 2020.

[1] Leonardo Abbrescia, Irit Huq-Kuruvilla, Jo Nelson, and Nawaz Sultani. Reeb dynamics of the link of the an singularity. *Involve, a Journal of Mathematics*, 10(3):417–442, Jan 2017.

Scholarships and Awards

- US National Science Foundation Postdoctoral Fellowship, 2020 - 2023
- Dr. William L. Harkness Endowed Fellowship, Michigan State University, 2020
- US National Science Foundation Graduate Research Fellowship, 2015 - 2020
- 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

Organization

Conferences Organized:

- *2021 Shanks Workshop on Mathematical Aspects of Fluid Dynamics*, Vanderbilt University, Nashville, TN, expected Summer 2021. (jointly organized with with J. Speck, M. Disconzi, and G. Simonett.)
- *Graduate Student Topology and Geometry Conference*, Michigan State University, East Lansing, MI, 2017. (jointly organized with with W. Chen, H. Gakhar, M. Hedden, and A. Mallick.)

Seminars Organized:

- *PDE Seminar* (jointly organized with Jared Speck and Marcelo Disconzi), Vanderbilt University, Nashville, 2020 -
- *Student PDE Seminar*, Michigan State University, East Lansing, 2017 - 2020

Invited Talks

10. Latinx Mathematicians Research Community, Virtual, June 2022.
9. Geometry & Analysis Seminar, Columbia University, NY, Nov 2021.
8. Mathematical GR and Hyperbolic PDE Seminar, Princeton University, NJ, May 2021.
7. PDE seminar, Vanderbilt University, TN, 2020.
6. Analysis and PDE seminar, Michigan State University, MI, 2019.
5. AMS Sectional, Special Session on Wave Phenomena in Fluids and Relativity, University of Wisconsin-Madison, Madison, WI, 2019.
4. Ohio River Analysis Meeting 9, University of Cincinnati, Cincinnati, OH, 2019.
3. Great Lakes Mathematical Physics Meeting, Michigan State University, East Lansing, MI, 2018.
2. Student PDE Seminar, Michigan State University, East Lansing, MI, 2017-2020.
1. Summer Undergraduate Math research at Yale, Yale University, New Haven, CT, 2014.

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 - 2020

- Department of mathematics representative on the graduate student council, Michigan State University, 2017-2018

Teaching Experience

Vanderbilt University:
Instructor
Spring 2022 MATH 3100 Intro to Real Analysis
Fall 2021 MTH 3100 Intro to Real Analysis
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: LaTeX

References

Jared Speck	Vanderbilt University	jared.speck@vanderbilt.edu
Willie W.Y. Wong	Michigan State University	wongwwy@math.msu.edu
Jonathan Luk	Stanford University	jluk@stanford.edu