

NICOLÒ FORCILLO

PERSONAL INFORMATION

Address: Michigan State University, Department of Mathematics, 619 Red Cedar Road, East Lansing, MI 48824,

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CURRENT EMPLOYMENT

Research Associate (Postdoctoral fellow), Michigan State University, Tutor: Prof. Russell Schwab, 2023-Present

PROFESSIONAL EXPERIENCES

Postdoctoral fellow, Università di Roma Tor Vergata, Tutor: Prof. Alessio Porretta, 2022-2023

Postdoctoral fellow, Università di Bologna, Tutor: Prof. Fausto Ferrari, 2021-2022

VISITING APPOINTMENTS

Institut Mittag-Leffler (Djursholm, Sweden)

Junior fellow inside the research program “Geometric aspects of nonlinear partial differential equations”, August-December 2022

University of Pittsburgh

Visiting fellow, Supervisor: Prof. Juan J. Manfredi, July-August 2022

Columbia University

Visiting fellow, Supervisors: Profs. Daniela De Silva, Ovidiu Savin, January-March 2020

The University of Western Australia (Perth)

Visiting fellow, Supervisors: Profs. Serena Dipierro, Enrico Valdinoci, July-September 2019

**RESEARCH
INTERESTS**

Specific: Free boundary problems, subelliptic equations, operators on graphs

Generic: Partial differential equations and applications, Calculus of Variations

EDUCATION

Ph.D. in Mathematics, Università di Bologna, December 2021

Advisor: Prof. Fausto Ferrari

Title of the thesis: Regularity in degenerate elliptic and parabolic free boundary problems

Master of Science in Mathematics (Magna Cum Laude), Università di Bologna, September 2018

Bachelor of Science in Mathematics (Magna Cum Laude), Università di Bologna, September 2016

**PUBLICATIONS
& PREPRINTS**

Publications

F. Ferrari, N. Forcillo, *A counterexample to the monotone increasing behavior of an Alt-Caffarelli-Friedman formula in the Heisenberg group*, Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl. 34 (2023), no. 2, 295–306

F. Ferrari, N. Forcillo, *Alt-Caffarelli-Friedman monotonicity formula and mean value properties in Carnot groups with applications*, Boll Unione Mat Ital (2023)

F. Ferrari, N. Forcillo, Juan J. Manfredi, *On the ∞ -Laplacian on Carnot groups*, J. Math. Sci. 268 (2022), No. 3, 310-322

S. Dipierro, F. Ferrari, N. Forcillo, E. Valdinoci, *Lipschitz regularity of almost minimizers in one-phase problems driven by the p -Laplace operator*, To appear in Indiana University Mathematics Journal, arXiv: 2206.03238

D. De Silva, N. Forcillo, O. Savin, *Perturbative estimates for the one-phase Stefan Problem*, Calc. Var. Partial Differential Equations 60 (2021), no. 6, Paper No. 219, 38 pp

F. Ferrari, N. Forcillo, *A new glance to the Alt-Caffarelli-Friedman monotonicity formula*, Math. Eng. 2 (2020), no. 4, 657-679

Ph.D. thesis

N. Forcillo, *Regularity in degenerate elliptic and parabolic free boundary problems*, 213 pp., Advisor: Prof. Fausto Ferrari

Review papers

S. Dipierro, F. Ferrari, N. Forcillo, E. Valdinoci *On the Lipschitz regularity for almost minimizers of a one-phase Bernoulli-type functional for the p -Laplacian*, *Matemática Aplicada, Computacional e Industrial MACI*, Vol. 9, 2023, 203-206, Proceedings of IX MACI 2023, Santa Fe, 8 al 11 de mayo de 2023

N. Forcillo, *Regularity of the free boundary in the one-phase Stefan problem: a recent approach*, *Bruno Pini Mathematical Analysis Seminar*, Vol. 12, n. 1, Univ. Bologna, Alma Mater Stud., Bologna, 2021, 122-140

F. Ferrari, N. Forcillo, *About the existence of an Alt-Caffarelli-Friedman monotonicity formula in the Heisenberg group*, *Matemática Aplicada, Computacional e Industrial MACI*, Vol. 8, 2021, 301-304, Proceedings of VIII MACI 2021, La Plata, 3 al 7 de mayo de 2021

S. Dipierro, A. Dzhugan, N. Forcillo, E. Valdinoci, *Enhanced boundary regularity of planar nonlocal minimal graphs, and a butterfly effect*, *Bruno Pini Mathematical Analysis Seminar*, Vol. 11, n. 1, Univ. Bologna, Alma Mater Stud., Bologna, 2020, 44-67

Submitted Preprints

F. Ferrari, N. Forcillo, D. Giovagnoli, D. Jesus, *Free boundary regularity for the inhomogeneous one-phase Stefan problem*, Submitted, arXiv: 2404.07535

F. Ferrari, N. Forcillo, E. M. Merlino, *Regularity for almost minimizers of a one-phase Bernoulli-type functional in Carnot Groups of step two*, Submitted, arXiv: 2311.02975

F. Buseghin, N. Forcillo, N. Garofalo, *A sub-Riemannian maximum modulus theorem*, Submitted, arXiv: 2305.19145

Master thesis

N. Forcillo, *Free Boundary Regularity of Some Non-Homogeneous Problems*, Advisor: Prof. Fausto Ferrari

**INSTRUCTOR
ACTIVITIES**

University: MICHIGAN STATE UNIVERSITY, Course: MATH 133—CALCULUS II, Academic Year: 2023/2024—SPRING SEMESTER

University: MICHIGAN STATE UNIVERSITY, Course: MATH 133—CALCULUS II, Academic Year: 2023/2024—SPRING SEMESTER

University: MICHIGAN STATE UNIVERSITY, Course: MATH 235 — DIFFERENTIAL EQUATIONS, Academic Year: 2023/2024—FALL SEMESTER

TALKS AND **Talks**

POSTERS AT

PROGRAMS AND 2024: “88th Midwest PDE Seminar”, Ohio State Univer-
CONFERENCES sity;

2023: “SIAM Great Lakes 2023”, Michigan State Univer-
sity; “Sub-Riemannian Geometry Harmonic Analysis, PDEs
and Applications”, Università di Bologna; “IX Congreso de
Matemática Aplicada, Computacional e Industrial”, Santa Fe
(Argentina)

2022: “Geometric aspects of nonlinear partial differential
equations”, Institut Mittag-Leffler, Djursholm (Sweden); “Non-
linear Meeting in Bologna”, Università di Bologna

2021: “Nonlinear Elliptic and Parabolic Partial Differential
Equations”, Levico Terme (Italy); “Regularity Theory for Free
Boundary and Geometric Variational Problems”, Levico Terme

Posters

2024: “Rivière-Fabes Symposium on Analysis and PDE”,
University of Minnesota

2023: “International Conference on Elliptic and Parabolic
Problems”, Accademia Pontaniana, Napoli

SEMINARS

2024: Analysis/PDE seminar, University of Pittsburgh

2023: Analysis & PDE seminar, Michigan State University; Analysis seminar, Università di Roma Tor Vergata; PDE seminar, Centro de Modelamiento Matemático, Universidad de Chile (online)

2022: Analysis/PDE seminar, University of Pittsburgh; two Analysis seminars, Università di Bologna

2021: “Seminario di Problemi Differenziali Non Lineari”, Università di Roma Sapienza; “Seminario di Analisi Matematica Bruno Pini”, Università di Bologna

**TEACHING
ASSISTANT
ACTIVITIES**

University: CENTRO DE INVESTIGACIÓN EN MATEMÁTICAS, Workshop: POTENTIAL THEORY WORKSHOP: INTERSECTIONS IN HARMONIC ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS, AND PROBABILITY, Course: THE OBSTACLE PROBLEM: AN INTRODUCTION TO FREE BOUNDARY PROBLEM, Instructor: EDUARDO TEIXEIRA

University: UNIVERSITÀ DI BOLOGNA, Course: MATHEMATICAL ANALYSIS III, Degree program: MATHEMATICS, Academic Years: 2021/2022, 2020/2021

University: UNIVERSITÀ DI BOLOGNA, Course: MATHEMATICAL ANALYSIS I, Degree program: CHEMICAL AND BIOCHEMICAL ENGINEERING, Academic Years: 2020/2021, 2019/2020

University: UNIVERSITÀ DI BOLOGNA, Course: MATHEMATICAL ANALYSIS II, Degree program: PHYSICS, Academic Year: 2019/2020