Luigi Forcella – CV

Contact Informations

Professional Position:	Associate Professor in Mathematical Analysis
Professional Address:	University of Pisa Department of Mathematics, Office 208 Largo Bruno Pontecorvo, 5 56127, Pisa – Italy
Email address:	luigi.forcella@unipi.it
Personal Webpage:	https://pagine.dm.unipi.it/forcella/index.html
ORCID Profile:	ORCID

Employment History

- 28 October 2025 – present: Associate Professor at the **University of Pisa, Department of Mathematics**.
- 28 October 2022 – 27 October 2025: Assistant Professor, tenure-track (Italian RTD-B – Ricercatore a Tempo Determinato di Tipo B), at the **University of Pisa, Department of Mathematics**.
  - 05 June 2023 – 05 June 2035: **National Scientific Qualification as Associate Professor** for the disciplinary field of 01/MATH-03 - Mathematical Analysis, Probability and Statistics (**Abilitazione Scientifica Nazionale alle funzioni di professore universitario di Seconda Fascia** nel Gruppo Scientifico-Disciplinare 01/MATH-03 - Analisi Matematica, Probabilità e Statistica Matematica, Settore Scientifico-Disciplinare MATH-03/A - Analisi Matematica).
- April 2022 – 27 October 2022: Assistant Professor, non-tenure track (Italian RTD-A – Ricercatore a Tempo Determinato di Tipo A), at the **University of L'Aquila**.
- October 2020 – March 2022: Research Associate (PostDoc) at the **Heriot-Watt University**, and **The Maxwell Institute for the Mathematical Sciences**.
  Supervisors: Professors Oana Pocovnicu and Tadahiro Oh.

  I was a member of the research team for the project `Deterministic and probabilistic dynamics of nonlinear dispersive PDEs`, funded by the "Engineering and Physical Sciences Research Council", Award EP/S033157/1, PI Prof. O. Pocovnicu.
- February 2018 – September 2020: Research Scientist (PostDoc) at **École Polytechnique Fédérale de Lausanne**.
  Supervisor: Professor Joachim Krieger.

  I was a member of the Chair of PDE.

Education

- **PhD in Mathematics (Diploma di Perfezionamento), Scuola Normale Superiore – Pisa.** Thesis: "Asymptotic problems for some classes of dispersive PDEs". Advisor: Professor Nicola Visciglia.

  Defended ***cum Laude*** on 19 February 2018.

Scientific committee: Professors Luigi Ambrosio (President, SNS), Franco Flandoli (SNS), Fulvio Ricci (SNS), Nikolay Tzvetkov (Referee, Cergy Pontoise – Paris), Luis Vega (Referee, BCAM – Bilbao), Nicola Visciglia (Advisor, University of Pisa).

- **M.S. in Mathematics (Laurea Magistrale), University of L'Aquila.** Thesis: "On the Zakharov System". Advisors: Professor Pierangelo Marcati (University of L'Aquila) and Dr. Paolo Antonelli (GSSI – L'Aquila).
  Final grade: **110/110 *cum Laude***.

- **B.A. in Mathematics (Laurea Triennale), University of L'Aquila.** Thesis: "The Stein-Tomas restriction theorem and Strichartz estimates". Advisor: Professor Pierangelo Marcati (University of L'Aquila).
  Final grade: **110/110 *cum Laude***.

Awards

- **Global Talent for Exceptional Talent, awarded by The Royal Society**

  With this award, I have been granted permission to enter and stay in the UK under the Global Talent route "for leader or potential leader in academia or research" from 1st April 2021 until 1st April 2024.

- **Kovalevskaya Grant, endorsed by the International Mathematical Union and funded through the ICM Local Organizing Committee**

  With this grant, I can attend the ICM 2022 in St. Petersburg[1].

Research Activity

5.1 Research Interests

My research mainly focuses on the analysis of nonlinear evolution PDEs describing some physical models. More precisely, my actual interests are about nonlinear dispersive PDEs, such as Schrödinger, Wave, Klein-Gordon, Zakharov equations with their related problems: local well-posedness & global well-posedness theory, low regularity theory, scattering theory, formation of singularities, dispersive PDEs on manifolds, probabilistic dynamics, variational analysis, etc.

5.2 Papers

5.2.1 Preprints

22. NLS with mass-subcritical combined nonlinearities: small mass L^2-scattering, oint work with J. Bellazzini (University of Pisa) and V. Georgiev (University of Pisa).
    Link: preprint;

21. Three waves interaction solitons for a energy-critical Schrödinger system, joint work with X. Luo (Hefei University of Technology) and X. Yang (Central China Normal University).
    Link: preprint;

[1] In-presence event cancelled, due to the Russo-Ukrainian War

20. Solitons, scattering and blow-up for the nonlinear Schrödinger equation with combined power-type nonlinearities on $\mathbb{R}^d \times \mathbb{T}$,
joint work with Y. Luo (Shenzhen MSU-BIT University) and Z. Zhao (Beijing Institute of Technology).
Link: preprint;

19. Invariant Gibbs dynamics for two-dimensional fractional wave equations in negative Sobolev spaces,
joint work with Oana Pocovnicu (Heriot-Watt University, Edinburgh).
Link: preprint;

5.2.2 Accepted papers

18. Standing waves for a Schrödinger system with three waves interaction,
joint work with X. Luo (Hefei University of Technology), T. Yang (Zhejiang Normal University), and X. Yang (Central China Normal University).
Mathematische Annalen.
Link: preprint;

5.2.3 Published papers

17. Mass-subcritical Half-Wave Equation with mixed nonlinearities: existence and non-existence of ground states and traveling waves,
joint work with J. Bellazzini (University of Pisa).
Discrete and Continuous Dynamical Systems, online first.
Links: publisher, preprint;

16. Local well-posedness and blow-up in the energy space for the 2D NLS with point interaction,
joint work with V. Georgiev (University of Pisa).
Proceedings of the Royal Society of Edinburgh Section A: Mathematics, online first.
Links: publisher, preprint;

15. Scattering for non-radial 3D NLS with combined nonlinearities,
joint work with J. Bellazzini (University of Pisa) and Van Duong Dinh (Ecole Normale Supérieure de Lyon).
SIAM Journal on Mathematical Analysis, Vol. 56, No. 3 (2024), pp. 3110-3143.
Links: publisher, preprint;

14. Ground state energy threshold and blow-up for NLS with competing nonlinearities,
joint work with J. Bellazzini (University of Pisa) and V. Georgiev (University of Pisa).
Annali della Scuola Normale Superiore di Pisa, Classe di Scienze (5), Vol. XXIV (2023), 955-988.
Links: publisher, preprint;

13. Dynamics of solutions to the Gross-Pitaevskii equation describing dipolar Bose-Einstein condensates,
joint work with J. Bellazzini (University of Pisa).
Qualitative Properties of Dispersive PDEs, Springer INdAM Series 52.
Links: publisher, preprint;

12. On finite time blow-up for a 3D Davey-Stewartson system,
Proceedings of the American Mathematical Society, 150 (2022), no. 12, 5421-5432.
Links: publisher, preprint.

11. Mass-Energy Threshold Dynamics for Dipolar Quantum Gases,
joint work with V. D. Dinh (University of Lille) and H. Hajaiej (California State University).
Communications in Mathematical Sciences, Vol. 20, No. 1, pp. 165-200 (2022).
Links: publisher, preprint;

10. Dynamical collapse of cylindrical symmetric Dipolar Bose-Einstein condensates,
joint work with J. Bellazzini (University of Sassari).
Calculus of Variations and Partial Differential Equations, 60, 229 (2021).
Links: publisher, preprint;

9. Sharp conditions for scattering and blow-up for a system of NLS arising in optical materials with χ^3 nonlinear response,
joint work with A. H. Ardila (IMPA, Rio de Janeiro) and V. D. Dinh (University of Lille).
Communications in Partial Differential Equations, 46:11, 2134-2170.
Links: publisher, preprint;

8. Blow-up results for systems of nonlinear Schrödinger equations with quadratic interaction,
joint work with V. D. Dinh (University of Lille).
Zeitschrift für angewandte Mathematik und Physik, Vol. 72, 178 (2021).
Links: publisher, preprint;

7. Large data scattering for the Nonlinear Klein-Gordon equation on waveguide $\mathbb{R}^d \times \mathbb{T}$,
joint work with L. Hari (Université Franche-Comté).
Journal of Hyperbolic Differential Equations, Vol. 17, No. 02, pp. 355-394 (2020).
Links: publisher, preprint;

6. Regularity results for rough solutions of the incompressible Euler equations via interpolation methods,
joint work with M. Colombo (EPFL) and L. De Rosa (EPFL).
Nonlinearity, 33 (2020) 4818-4836.
Links: publisher, preprint;

5. Asymptotic dynamic for dipolar Quantum Gases below the ground state energy threshold,
joint work with J. Bellazzini (University of Sassari).
Journal of Functional Analysis, 277 (2019), no. 6, 1958-1998.
Links: publisher, preprint;

4. Blow-up or global existence for the fractional Ginzburg-Landau equation in multi-dimensional case,
joint work with K. Fujiwara (CRM Ennio De Giorgi, Pisa), V. Georgiev (University of Pisa) and T. Ozawa (Waseda University, Tokyo).
New Tools for Nonlinear PDEs and Applications – Trends in Mathematics (2019), Birkhäuser.
Links: publisher; preprint;

3. Local Well-posedness and Blow-up for the Half Ginzburg-Landau-Kuramoto equation with rough coefficients and potential,
joint work with K. Fujiwara (CRM Ennio De Giorgi, Pisa), V. Georgiev (University of Pisa) and T. Ozawa (Waseda University, Tokyo).
Discrete and Continuous Dynamical Systems, 2019 Vol. 39, N. 5, 2661-2678.
Links: publisher, preprint;

2. Double scattering channels for 1D NLS in the energy space and a generalization to higher dimensions,
joint work with N. Visciglia (University of Pisa).
Journal of Differential Equations, 264 (2018), no. 2, 929-958.
Links: publisher, preprint;

1. The electrostatic limit for the 3D Zakharov system,
   joint work with P. Antonelli (GSSI, L'Aquila).
   Nonlinear Analysis, 163 (2017), 19-33.
   Links: publisher, preprint.

Organising activity

- Recent developments in PDEs: theory and applications. A conference in honour of Vladimir Georgiev's 70th birthday, University of Pisa. Conference Webpage
- Dispersive equations of Math Physics, 03-05 March 2025, Department of Mathematics, University of Pisa. Conference Webpage
- A three-day dispersive meeting in Pisa, 08-10 February 2024, Department of Mathematics, University of Pisa. Conference Webpage
- International Conference on Partial Differential Equations and Applications in honour of the 70th birthday of Pierangelo Marcati, L'Aquila 19-24 June 2023. Conference Webpage
- 12th Meeting on Nonlinear evolution PDEs, fluid dynamics and transport equations, L'Aquila, 13-15 July 2022. Conference Webpage

Services

Committee

- Member of the Board of the Ph.D. Program, Department of Mathematics, University of Pisa, since 01 November 2024

PhD Committee

- Referee and member of the Committee for the PhD Thesis of Boris Shakarov (GSSI, 05 June 2023)

Editorial Activity

- Guest Editor for the special issue **Nonlinear dispersive, hyperbolic, and parabolic PDEs** of the journal **Nonlinear Analysis**
- Guest Editor for the special issue **Math aspects of classical and quantum fluid dynamics** of the journal **Mathematics in Engineering - MinE**

Other

- I serve as a Referee for international mathematical journals.
  I am also a contributor to MathSciNet as a Reviewer (MathSciNet Reviewer number: 135165)

Tutoring Activity

- Spring Semester 2020: supervision of François Pagano for his Master Thesis at EPFL. Thesis: Existence of maximizers for generalized Gagliardo-Nirenberg inequalities and non-scattering solutions to the nonlinear Half-Wave equations. Defended on 24 June 2020. François got a Phd at the University of Geneva, under the supervision of Prof. Alexander Logunov in March 2024.

- Fall Semester 2019: supervision of François Pagano for his Master Project at the EPFL. Title of the Project: Pointwise convergence results for the linear Schrödinger equation.
- Spring Semester 2018: supervision of Rayan Elalamy for his Bachelor Project at the EPFL. Title of the Project: Sobolev spaces and an application to the Schrödinger evolution equation.

Languages

Italian (mother-tongue), English, French.

Pisa, 01 December 2025