

CURRICULUM VITAE

Serena Federico

Ricercatore a tempo determinato di tipo A (Junior Assistant Professor)

Dipartimento di Matematica

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RESEARCH INTERESTS

Local solvability of Partial differential equations, Degenerate Partial differential operators, Pseudo-differential operators, a priori estimates, Microlocal Analysis, Hypoellipticity, Carleman estimates, Dispersive equations, Pseudo-differential operators on Lie groups, Coercive inequalities.

CURRENT POSITION

Dec 2021 – now: Ricercatore a tempo determinato di tipo A (Junior Assistant Professor), Università di Bologna, Italy.

AWARDS

- [2024 Summer Research in Mathematics \(SRiM\) at MSRI/SLMath](#), Berkeley, California. Award assigned to the group composed by Xueying Yu and Serena Federico. The research period July 1-12, 2024, is entirely funded by SLMATH.
- 2022 – GNAMPA travel grant to support the participation in the Workshop “[Mathematical Encounters II](#)”, Buenos Aires, Argentina.
- H2020-MSCA-IF 2018 (Marie Skłodowska Curie Individual Fellowship). Duration of the fellowship: 2 years.

EDUCATION

June-Dec 2021	Postdoctoral researcher, Ghent University, Belgium.
2019-2021	Marie Skłodowska Curie Fellow, Ghent University, Belgium.
2017-2019	Postdoctoral Researcher in Mathematics, University of Bologna, Italy.
2013 - 2017	PhD in Mathematics, University of Bologna, Italy. Title of the thesis: <i>Local solvability of a class of degenerate second order operators</i> . Supervisor: Prof. Alberto Parmeggiani. Date of defense: 30/01/2017. Committee: M. Cicognani, D. Del Santo, G. Mendoza.
2010 - 2012	Master Degree in Mathematics, University of Bologna, Italy. Title of the thesis: <i>Convolution equations</i> . Supervisor: Prof. Alberto Parmeggiani.
2006 - 2010	Bachelor Degree in Mathematics, University of Bologna, Italy. Title of the thesis: <i>Il metodo COS per la valutazione dei derivati</i> . Supervisor: Prof. Andrea Pascucci.

TEACHING ACTIVITY

Apr. 2-5, 2024	Instructor of the (4h) Advanced Mini Course “Weyl Calculus on Graded Lie Groups” in the Spring School: <i>Modern Aspects on Analysis on Lie Groups</i> , University of Göttingen, Germany. https://jaeh.cc/SS2024/index.htm
2023-2024	Instructor for the course <i>Mathematical Analysis T1</i> , Bachelor of Science in Chemical and Biochemical Engineering, University of Bologna.
20 March - 6 April 2023	Instructor for the (15h) PhD Course <i>Introduction to dispersive equations and nonlinear problems</i> , PhD in Mathematics, University of Bologna.
2022-2023	Instructor for the course <i>Mathematical Analysis T1</i> , Bachelor of Science in Chemical and Biochemical Engineering, University of Bologna.
2021-2022	Instructor for the course <i>Mathematical Analysis T2</i> , Bachelor of Science in Electrical Engineering and Electronics and Bachelor of Science Telecommunication, University of Bologna.
2017-2018	Teaching assistant for the course <i>Analysis 2</i> , Bachelor of Science in Electronics and Telecommunication Engineering and Bachelor of Science in Chemical and Biochemical Engineering, University of Bologna. Instructors: Prof. Fausto Ferrari and Prof. Alberto Parmeggiani.
2016 - 2017	Teaching assistant for the course <i>Analysis 1</i> , Bachelor of Science in Electrical Engineering, University of Bologna. Instructor: Prof. Annalisa Baldi.
2015 - 2016	Teaching assistant for the course <i>Analysis 2</i> , Bachelor of Science in Computer Engineering, University of Bologna. Instructor: Prof. Carlo Ravaglia.
2015 - 2016	Teaching assistant for the course <i>General Mathematics</i> , Bachelor of Economics in Management and Marketing, University of Bologna. Instructor: Prof. Alberto Parmeggiani.
2014 - 2015	Teaching assistant for the course <i>General Mathematics</i> , Bachelor of Economics in Management and Marketing, University of Bologna. Instructor: Prof. Alberto Parmeggiani.
2014 - 2015	Teaching assistant for the course <i>Analysis 1</i> , Bachelor of Science in Computer Engineering, University of Bologna. Instructor: Prof. Carlo Ravaglia.
2013 - 2014	Teaching assistant for the course <i>Analysis 2</i> , Bachelor of Science in Computer Engineering, University of Bologna. Instructor: Prof. Carlo Ravaglia.

OTHER TITLES

Qualification à maître de conférences sections 25 et 26 campagne 2018.

LANGUAGES

Italian: mother tongue

English: fluent

RESEARCH VISITS

May 9-24, 2023	Department of Mathematics, Massachusetts Institute of Technology.
Nov 11-31, 2020	Department of Mathematics, Massachusetts Institute of Technology.

- Mar 4, 2020 Imperial College London, London, United Kingdom.
- Sept 13-23, 2019 Department of Mathematics, University of Bologna.
- Jun 21- Jul 1, 2019 Department of Mathematics, University of Bologna.
- Oct – Dec 2018 Visiting scholar at Massachusetts Institute of Technology, Cambridge, Massachusetts.
Mentor: Prof. Gigliola Staffilani.
- Jan - Apr 2016 Visiting student at Massachusetts Institute of Technology, Cambridge, Massachusetts.
Mentor: Prof. Gigliola Staffilani.

CONFERENCE PRESENTATIONS AND INVITED TALKS

- May 6-7, 2024 *Unique continuation properties of variable coefficient Schrödinger equations.* Conference: [Dispersion and Geometry in Padova](#), University of Padova.
- Mar. 14, 2024 *Uniqueness properties of variable coefficient Schrödinger equation.* Bruno Pini Mathematical Analysis Seminar, University of Bologna, Italy.
- Feb. 20, 2024 *Weyl calculus on graded groups.* Online Tbilisi Analysis & PDE Seminar.
- Feb 12-16, 2024 *Weyl calculus on graded groups.* Conference: [Microlocal and Global Analysis, Interaction with Geometry](#). University of Potsdam, Potsdam, Germany.
- Feb 8-10, 2024 *Unique continuation properties of variable coefficient Schrödinger equations.* Workshop: [A three day Dispersive Meeting in Pisa](#), University of Pisa, Italy.
- Jan 29-Feb 2, 2024 *Weyl calculus on graded groups.* Conference: [Pseudo Differential Operators and Related Topics](#), Ghent University, Ghent, Belgium.
- Sept 2023 *A short tour on the role of some a priori estimates.* Conference: [More Anomalies in PDEs and Application, in honour of the 60th birthday of Daniele Del Santo and Alberto Parmeggiani](#), Centro Residenziale Universitario, Bertinoro, Italy.
- Aug-Sept 2023 *Weyl calculus on graded groups.* Workshop: [From operator algebras to PDEs](#), University of Angers, France.
- July 2023 *On some variable coefficient Schrödinger equations.* Conference: [Sub-Riemannian Geometry Harmonic Analysis, PDEs and Applications](#), University of Bologna, Italy.
- Dec 2022 *Unique continuation properties of Schrödinger equations with variable coefficients,* [Mathematical Encounters II](#), Instituto Argentino de Matemática-Alberto P. Calderón (CONICET), Buenos Aires, Argentina.
- Oct 2022 *Unique continuation properties of variable coefficient Schrödinger equations,* [Workshop on Fourier Analysis, Linear PDEs, and Related Topics](#). Celebrating the 75th birthday of Adalberto Bergamasco. Online event (Brazil).
- Sept 2022 *On some variable coefficient Schrödinger operators on the torus,* [GF 2022, International Conference on Generalized Functions 2022](#), University of Vienna, Austria.
- Jul 2022 *On some variable coefficient NLS equations on the torus,* [Workshop on Microlocal Analysis and PDEs](#), University college London, United Kingdom.
- Jan-Feb 2022 *Strichartz estimates for some variable coefficient Schrödinger operators,* [ICMC Summer meeting on Differential Equations](#), online conference (Brazil).

- Mar 2022 *On some variable coefficient Schrödinger operators on $\mathbb{R} \times \mathbb{T}^2$* , [London-Ghent Microlocal Analysis Workshop](#), Imperial College London, United Kingdom, and Ghent University, Belgium.
- Jan 2022 *Strichartz estimates for some variable coefficient Schrödinger operators*, [Geometric aspects of complex and harmonic analysis](#) workshop, Bologna, Italy.
- Jan 2022 *Strichartz estimates for some variable coefficient Schrödinger operators*, [ICMC Summer Meeting on Differential Equations 2022](#), São Carlos, Brazil.
- Dec 14, 2021 *Strichartz estimates for some variable coefficient Schrödinger operators*, webinar in [Recent Advances in Nonlinear Evolution Equations](#).
- Aug 2021 *Smoothing effect and Strichartz estimates for some time-degenerate Schrödinger operators*, [13th International ISAAC Congress](#), Ghent, Belgium.
- June 2021 *Smoothing effect, Strichartz estimates and local well-posedness for some time-degenerate Schrödinger operators*, Online workshop on hyperbolic equations and related topics.
- May 2021 *Smoothing and Strichartz estimates for some time-degenerate Schrödinger operators*, Generalized Function Online Workshop.
- Apr 7-9, 2021 *Smoothing and Strichartz estimates for some time-degenerate Schrödinger operators*, 14th Symposium on Partial Differential Equations, UFPR, Brazil.
- Mar 1, 2021 *Smoothing effect and Strichartz estimates for some time-degenerate Schrödinger operators*, Analysis seminar, Temple University, Philadelphia (USA).
- Oct 19-21, 2020 *Smoothing and Strichartz estimates for a class of time-degenerate Schrödinger operators*, Workshop: Coercive inequalities and PDEs, Imperial College.
- Aug 31-Sept 4, 2020 *Smoothing and Strichartz estimates for degenerate Schrödinger-type equations*, International Conference on Generalized Functions, Ghent, Belgium.
- Feb 10-12, 2020 *Smoothing effect for time-degenerate Schrödinger operators*, Workshop: Dispersive and Subelliptic PDEs, Centro De Giorgi, Pisa, Italy.
- Feb 3-5, 2020 *On the local solvability of some degenerate linear partial differential operators*, ICM Summer meeting 2020, São Carlos, Brazil.
- Sept 2019 *Local solvability of some partial differential operators with non-smooth coefficients*, INDAM Workshop: Anomalies in PDEs, Università la Sapienza di Roma, Italy.
- Dec 2018 *Sufficient conditions for local solvability of some degenerate partial differential operators*, MIT PDE/Analysis Seminar, Dept. of Mathematics, Massachusetts Institute of Technology, Cambridge, Massachusetts.
- Dec 2018 *Sufficient conditions for local solvability of some degenerate partial differential operators*, PDE & Geometric Analysis Seminar, UW-Madison Dept. of Mathematics, Madison, Wisconsin.
- Mar 2017 *Local solvability of a class of degenerate second order operators*, Bruno Pini Analysis Seminar, University of Bologna, Italy.
- June 2016 *Local solvability of a class of degenerate second order operators with smooth and non-smooth coefficients*, Graduate Student Seminar, Centre d'analyse et de mathématique sociales (CAMS), Paris.
- Mar 2016 *Local solvability of a class of degenerate second order operators with smooth and non smooth coefficients*, Analysis Seminar, Temple University, Philadelphia.

- Mar 2016 *Local and global well-posedness for the $H^1(\mathbb{R}^n)$ subcritical nonlinear Schrödinger*, Graduate Student Seminar, Temple University, Philadelphia.
- May 2013 *Weighted estimates for the $\bar{\partial}$ -operator*, Analysis Seminar, University of Bologna
- May 2013 *Compactness of the $\bar{\partial}$ -operator*, Analysis Seminar, University of Bologna.

ORGANIZING COMMITTEES

- Feb 2021-2023 *Ghent Methusalem Junior Seminar.*
<https://analysis-pde.org/ghent-methusalem-junior-seminar/>
- Oct 19-21, 2020 *Coercive Inequalities and PDEs*, Imperial College London.
<https://sites.google.com/view/coercive-inequalities-and-pdes>
- July 7-8, 2020 *Pseudo-Differential Conference 2020*, Ghent Analysis & PDE Center, Ghent, Belgium. <https://analysis-pde.org/noncommutative-conference/>

CONFERENCES AND SCHOOLS ATTENDED

- Sept-Dec 2021 [*Hamiltonian Methods in Dispersive and Wave Evolution Equations*](#), (online participation) ICERM, Providence.
- Feb 26-27, 2021 *Recent Advances in Global Analysis*, Temple University, Philadelphia.
- Aug 18-20, 2020 *Noncommutative Conference 2020*, Ghent Analysis & PDE Center, Ghent University, Ghent, Belgium.
- Feb 10-12, 2020 *Workshop: Dispersive and Subelliptic PDEs*, Centro De Giorgi, Pisa, Italy.
- Feb 3-5, 2020 *ICM Summer meeting 2020*, Saõ Carlos, Brazil.
- Sept 9-12, 2019 *INDAM Workshop: Anomalies in PDEs*, Università la Sapienza di Roma, Italy.
- Jul 29-Aug2, 2019 *12th ISAAC Congress*, University of Aveiro, Portugal.
- Sept 10-14, 2018 *Linear and Nonlinear Wave Phenomena: Stability, Propagation of Regularity and Turbulence*, Cortona, Italy.
- July 2-6, 2018 *Microlocal and Time Frequency Analysis 2018 in honor of the 70th birthday of Luigi Rodino*, Torino, Italy.
- Nov 30-Dec 1, 2017 *Simposio di Analisi Matematica in occasione dei 70 anni di Ferruccio Colombini*, Pisa.
- July 17-28, 2017 Summer graduate School: *Nonlinear dispersive PDE, quantum many particle systems and the world between*, Cortona, Italy.
- Sept 12-15, 2017 Summer School: *Harmonic Analysis, Spectral Theory and PDE's*, Rome, Italy.
- June 9-10, 2016 *Two-day Meeting on linear and nonlinear PDE's in honor of the 65th birthday of Cristian Gutierrez*, Bologna, Italy.
- Sept 14-18, 2015 *Shocks, Singularities and Oscillations in Nonlinear Optics and Fluid Mechanics*, INDAM, Rome.
- June 9-11, 2015 *2th Advanced Course in Operator Theory and Complex Analysis*, Bologna.
- Mar 9-11, 2015 *School/Workshop Phase transition problems and nonlinear PDEs*, Bologna.
- Mar 4-6, 2015 *Mini-courses and workshop on Geometric Analysis in the Heisenberg group*, Bologna.

- Jan 22-24, 2014 *Fifth Itinerant Workshop on PDEs*, De Giorgi Center, Pisa.
- July 1-4, 2014 *Linear and Nonlinear Hyperbolic Equations*, De Giorgi Center, Pisa.
- Mar 15-16, 2013 *Proprietà Geometriche Microlocali delle Equazioni alle Derivate Parziali*, Cesena.

PUBLICATIONS

PREPRINTS

1. S. Federico, D. Rottensteiner, M. Ruzhansky, *Weyl Calculus on Graded Groups*, Preprint. Arxiv <https://arxiv.org/abs/2306.04275>.
2. M. Chatzakou, S. Federico, B. Zegarlinski, *Poincaré inequalities on Carnot Groups and spectral gap of Schrödinger operators*, Preprint. Arxiv <https://arxiv.org/abs/2211.09471> (2022).

PUBLISHED

1. S. Federico, *Carleman estimates for third order operators of KdV and non KdV-type and applications*. Annali di Matematica Pura ed Applicata (2024). <https://doi.org/10.1007/s10231-024-01467-7>
2. S. Federico, Zongyuan Li, Xueying Yu, *On the uniqueness of variable coefficient Schrödinger equations*. Communications in Contemporary Mathematics (2024). <https://doi.org/10.1142/S0219199724500160>
3. D. Cardona, S. Federico, M. Ruzhansky, *Subelliptic sharp Gårding inequality on compact Lie groups*. Pure and Applied Analysis 6-2 (2024), 455-485. DOI 10.2140/paa.2024.6.455. <https://doi.org/10.2140/paa.2024.6.455>
4. S. Federico, M. Ruzhansky, *Smoothing and Strichartz estimates for degenerate Schrödinger-type equations*. Nonlinear Analysis, Volume 242, 113500. <https://doi.org/10.1016/j.na.2024.113500>
5. M. Chatzakou, S. Federico, B. Zegarlinski, *q-Poincaré inequalities on Carnot Groups with filiform type Lie algebra*. Potential Anal 60, 1067-1092 (2024). <https://doi.org/10.1007/s11118-023-10079-4>
6. S. Federico, *Smoothing Effect and Strichartz Estimates for Some Time-degenerate Schrödinger Equations*. In: Ruzhansky, M., Wirth, J. (eds) Harmonic Analysis and Partial Differential Equations (2022). Trends in Mathematics. Birkhäuser, Cham. https://doi.org/10.1007/978-3-031-24311-0_2
7. S. Federico, *On some variable coefficient Schrödinger operators on $\mathbb{R} \times \mathbb{R}^n$ and on $\mathbb{R} \times \mathbb{T}^2$* . Matemática Contemporânea Vol 52 (2022), ICMC Summer Meeting on Differential Equations - Chapter 2022, 17-37, <http://doi.org/10.21711/231766362022/rmc522>.
8. S. Federico, A. Parmeggiani, *On a class of pseudodifferential operators on the product of compact Lie groups*. Math. Nachr. 269 (2023), 217-242, <https://doi.org/10.1002/mana.202100400>.
9. S. Federico, G. Staffilani, *Sharp Strichartz estimates for some variable coefficients Schrödinger operators on $\mathbb{R} \times \mathbb{T}^2$* . Mathematics in Engineering 2022, 4 (4): 1-23, [doi:10.3934/mine.2022033](https://doi.org/10.3934/mine.2022033).
10. S. Federico, G. Staffilani, *Smoothing effect for time-degenerate Schrödinger operators*. Journal of Differential Equations 298 (2021), 205-247, <https://doi.org/10.1016/j.jde.2021.07.006>.
11. S. Federico, *Local Solvability of Some Partial Differential Operators with Non-smooth Coefficients*, Springer Nature Switzerland AG 2021 M. Cicognani et al. (eds), *Anomalies in Partial Differential Equations*, Springer INdAM Series 43, http://doi.org/10.1007/978-3-030-61346-4_12.
12. S. Federico, A. Parmeggiani, *On the Solvability of a Class of Second Order Degenerate Operators*. P. Boggiatto et al. (eds.), *Advances in Microlocal and Time-Frequency Analysis*, Springer Nature Switzerland AG 2020, pp. 207-226.
13. S. Federico, *Sufficient conditions for local solvability of some degenerate PDO with complex subprincipal symbol*, J. Pseudo-Differ. Oper. Appl. 10 (4) (2019) 929-940, <https://doi.org/10.1007/s11868-018-0264-x>.
14. S. Federico, A. Parmeggiani, *On the local solvability of a class of degenerate second order operators with complex coefficients*, Comm. Partial Differential Equations 43 (10) (2018) 1485-1501.

15. S. Federico, *Local solvability of a class of degenerate second order operators*, Bruno Pini Mathematical Analysis Seminar, Vol. 8 (2017) 185-203.
16. S. Federico, *A model of solvable second order PDE with non smooth coefficients*, J. Math. Anal. Appl. 440 (2016) 661-676.
17. S. Federico, A. Parmeggiani, *Local solvability of a class of degenerate second order operators*, Comm. Partial Differential Equations 41 (03) (2016) 484-514.

MEMBERSHIPS

- From August 2020, member of ISAAC - International Society for Analysis its Applications and Computation. <http://isaacmath.org/home/>
- From June 2019, member of Ghent Analysis & PDE Center, Ghent, Belgium. <https://analysis-pde.org>
- From 2016 member of GNAMPA-INDAM.
- Member of Marie Curie Alumni Association.