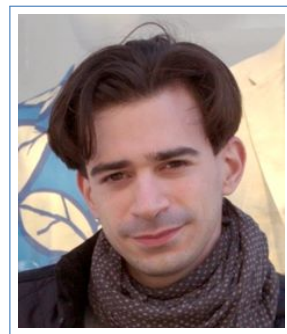


# Marcello Malagutti

## Curriculum Vitae

Department of Mathematics  
University of Bologna  
P.zza di Porta S. Donato 5, Bologna 40126, Italy  
✉ marcello.malagutti2@unibo.it



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### Personal information

First name Marcello  
Last name Malagutti  
Place and date of birth Castel San Pietro Terme (Bologna, Italy), March 11, 1996  
Nationality Italian  
Position PhD student  
Affiliation Department of Mathematics, Univeristy of Bologna  
E-mail marcello.malagutti2@unibo.it

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### Education

November 2020–ongoing **PhD student in Mathematics**, *University of Bologna*, Italy  
(*First position in the winners ranking of the admission application*)  
Thesis: *Spectral Asymptotic Properties of Semi-Regular Non-Commutative Harmonic Oscillators*  
Supervisor: Prof. Alberto Parmeggiani  
Reviewers: Prof. Jared Wunsch, Prof. Sandro Coriasco

September 2018–June 2020 **Master Degree in Mathematics**, *University of Bologna*, Italy  
Thesis:  *$C^m$  Solutions of linear Equations with Continuous Semialgebraic Coefficients*  
Supervisor: Prof. Alberto Parmeggiani  
Final mark: 110/110 *summa cum laude*  
(Average exam score: 29.86 out of 30)

September 2015–June 2018 **Bachelor of Science in Mathematics**, *University of Bologna*, Italy  
Thesis: *Continuous solutions of differential equations*  
Supervisor: Prof. Alberto Parmeggiani  
Final mark: 110/110 *summa cum laude*  
(Average exam score: 29.62 out of 30)

2015–2020 **Fellow**, *Collegio Superiore*, *University of Bologna*, Italy  
Note: "Collegio Superiore" is an institute of excellence of the University of Bologna. Admission and permanence are based exclusively on merit.

2018–2020 **Second Level University Diploma**, *Collegio Superiore*, *University of Bologna*, Italy

2015–2018 **First Level University Diploma**, *Collegio Superiore*, *University of Bologna*, Italy

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## Visits

16 April–15 July, 2022 **PHD Exchange Student**, *Ghent Analysis & PDE Center - Ghent University*, Belgium  
Invited by Prof. Michael Ruzhansky.  
Activities: Studies and research in *spectral analysis* and *non-commutative analysis*.

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## Scientific Interests

Mathematics Harmonic analysis, Phase-space analysis,  
Geometrical analysis of PDEs, Spectral theory,  
Real semialgebraic geometry  
Mathematical Physics Quantum field theory, Quantum mechanics

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## Publications and Preprints

1. M. Malagutti, A. Parmeggiani. *Spectral Quasi-Clustering Estimates for Certain Semiregular Systems*. Preprint (2023)
2. M. Malagutti. *On the Spectral Zeta Function of Second Order Semiregular Non-Commutative Harmonic Oscillators*. Submitted (Preprint ArXiv:2302.09063v2) (2023)
3. M. Malagutti, A. Parmeggiani. *Spectral Asymptotic Properties of Semiregular Non-Commutative Harmonic Oscillators*. Submitted preprint (2022)
4. M. Malagutti. *Semialgebraic and Continuous Solution of Linear Equation with Semialgebraic Coefficients*. (Preprint ArXiv:2202.05815) (2023)

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## Scholarships

November 2020–ongoing **PhD Scholarship**, *University of Bologna*, Italy

2015–2020 **Five-year Collegio Superiore Scholarship**, *University of Bologna*, Italy  
(2650 Euro/year, exemption from tuition fees, lodging)

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## Teaching Activities

Academic year 2022-23 **Teaching assistant**, *Analisi Superiore e PDE (Higher Analysis and PDEs)*, *Master degree in Mathematics*, University of Bologna  
Study support for students (12 hours)

Academic year 2022-23 **Teaching assistant**, *Analisi Superiore (Higher Analysis)*, *Master degree in Mathematics*, University of Bologna  
Weekly exercises, study support for students, collaboration in exams running (24 hours)

Academic year 2021-22 **Teaching assistant**, *Numeri Primi e Crittografia (Prime Numbers and Cryptography)*, *Project "Scientific Degree Plan"*, University of Bologna  
Lectures, tutorials, collaboration in tests running (10 hours)

Academic year 2022-23 **Teaching assistant**, *Analisi Superiore e PDE (Higher Analysis and PDEs)*, *Master degree in Mathematics*, University of Bologna  
Study support for students (12 hours)

- Academic year 2021-22 **Teaching assistant**, *Analisi Superiore (Higher Analysis)*, Master degree in Mathematics, University of Bologna  
Weekly exercises, study support for students, collaboration in exams running (12 hours)
- Academic year 2021-22 **Teaching assistant**, *Numeri Primi e Crittografia (Prime Numbers and Cryptography)*, Project "Scientific Degree Plan", University of Bologna  
Lectures, tutorials, collaboration in tests running (10 hours)
- Academic year 2020-21 **Teaching assistant**, *Analisi Superiore II (Higher Analysis II)*, Master degree in Mathematics, University of Bologna  
Study support for students (12 hours)
- Academic year 2020-21 **Teaching assistant**, *Analisi Superiore I (Higher Analysis I)*, Master degree in Mathematics, University of Bologna  
Study support for students (12 hours)
- Academic year 2018-19 **Teaching support activity**, *Analisi Matematica II (Calculus II)*, Bachelor degree in Mathematics, University of Bologna  
Weekly exercises, study support for students (100 hours)

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## Research Talks

### • Seminars Talks

- April 1, 2022 **Invited seminar at "Ghent Analysis & PDE Center - Friday weekly seminars"**, Ghent University, Belgium, (on-line)  
Title: *Spectral Properties of a Class of Semiregular Pseudodifferential Systems*
- May 18, 2021 **Invited seminar at "Ghent Methusalem Junior Seminar (Spring 2021)"**, Ghent Analysis & PDE Center - Ghent University, Belgium, (on-line)  
Title: *A Crash Introduction to Non-Commutative Harmonic Oscillators (NCHOs)*

### • Conference Talks

- August 20-25, 2023 **Invited talk at "10th International Congress on Industrial and Applied Mathematics - ICIAM 2023 Tokyo"**, Waseda University, Tokyo, Giapan, (on-line)  
Title: *On the Spectral Zeta Function of Second Order Semiregular Non-Commutative Harmonic Oscillator*

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## Conferences Attendance

- June 12-16, 2023 **Harmonic Analysis, PDEs, and GMT in Bilbao 2023**, University of the Basque Country, Spain
- October 17-19, 2022 **Workshop on Fourier Analysis, Linear PDEs, and Related Topics**, Jointly organised by UFPR ("Università federale del Paraná", Panama) and ICMC-USP ("Università federale del Paraná", San Paolo, Brazil), ((Web Seminar))  
Celebrating the 75th birthday of Adalberto Bergamasco.
- May 23-27, 2022 **Conference 100 UMI - 800 UniPD**, University of Padua & UMI, Italy
- May 18-20, 2022 **Trends in Calculus of Variations and PDEs**, Jointly organised by University of Sussex (UK) and Ghent Analysis & PDE Centre, UGent, (On-line Conference on Zoom)

- May 13, 2022 **Belgium PhD day 2022**, *University of Liege*, Belgium, (with UGent travel grant)
- September 16-18, 2021 **Recent Advances in Global Analysis and PDEs**, *Department of Mathematics - University of Bologna*, Italy  
A meeting in honour of Bruno Franchi
- February 26-27, 2021 **Recent Progress in Geometric Analysis and PDE**, *College of Science and Technology - Temple University*, Philadelphia, Pennsylvania (US) (*on-line*)
- July 7-8, 2020 **International Conference on Pseudo-differential Operators**, *Ghent Analysis & PDE Center - Ghent University*, Belgium, (*on-line*)
- May 25-27, 2020 **Variational and PDE problems in Geometric Analysis, III**, *University of Bologna*, Italy, (*on-line*)
- November 28-29, 2019 **Two days on CalcVar&PDEs**, *University of Bologna*, Italy, (Workshop)

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## Schools, Courses and Seminars Attendance

### • Schools

- June 26-30, 2023 **Hausdorff School: "Recent Advances in Quantum and Statistical Mechanics"**, *Hausdorff Center for Mathematics*, Bonn, Germany
- August 22-31, 2022 **Summer school on "Singularities in Science and Engineering"**, *Ghent Analysis & PDE Center - Ghent University*, Belgium, (*on-line*)
- July 14-10, 2022 **Summer school on physical sensing & processing – IV edition: "Quantum Sensing, Information Processing and Computing"**, *Department of Physics & Astronomy – University of Bologna*, Italy
- January 13-17, 2020 **Winter school on "Integrable Systems and Representation Theory"**, *University of Bologna*, Italy, (*on-line*)
- December 16-18, 2019 **Junior Math Days**, *SISSA*, Trieste, Italy  
(With SISSA travel grant for Master students)

### • Courses

- March 20–April, 6, 2023 **"Introduction to dispersive equations and nonlinear problems"** (*Prof. Serena Federico*), *Department of Mathematic - University of Bologna*, Italy  
(Course for PhD students: 15 hours)
- Nov. 21–Jan. 21, 2022 **"Mathematics of quantum spin systems"** (*Prof. A.Lucia*), *Department of Mathematic - University of Bologna*, Italy  
(Course for PhD students: 16 hours)
- November 22-24, 2022 **"Spectral theory of differential operators: what's it all about and what is its use"** (*Prof. D.Vassiliev*), *Ghent Analysis & PDE Center - Ghent University*, Belgium  
(Mini-course on Spectral Asymptotic)
- June 30-July 1, 2022 **"Harmonic analysis on Symmetric Spaces"** (*Prof. A.Fotiadis*), *Ghent Analysis & PDE Center - Ghent University*, Belgium  
(Mini-course)
- Nov.24, 2021–Jan.13, 2022 **"The isoperimetric inequality outside convex sets"** (*Prof. N.Fusco*), *Department of Mathematics - Technical University of Munich*, Germany  
(On-line course: 12 hours)

- Nov.16, 2021–Jan.18, 2022 **"Random measures and multiplicative chaos"** (*Prof. Prof. A.Bufetov*), Department of Mathematic - Univesity of Bologna, Italy  
(Course for PhD students: 30 hours)
- May 27-June 7, 2021 **"An introduction to free boundary problems"** (*Prof. O.Savin*), Department of Mathematic - Univesity of Bologna, Italy  
(Course for PhD students: 16 hours)
- April, 2021 **"Combinatorics of Diagonal Coinvariants"** (*Prof. M.D'Adderio*), Department of Mathematic - Univesity of Bologna, Italy  
(Course for PhD students: 10 hours)
- Nov. 27-Dec. 18, 2020 **"Introduction to Free Boundary Problems"** (*Prof. G.Tortone*), Department of Mathematic - Univesity of Bologna, Italy  
(Course for PhD students: 16 hours)
- October 14-26, 2020 **"Hilber spaces of integer functions and point processes"** (*Prof. D.Lazzaro*), Department of Mathematic - Univesity of Bologna, Italy  
(Course for PhD students: 16 hours)
- Sep. 29-Dec. 12, 2020 **"Hilber spaces of integer functions and point processes"** (*Prof. A.Bufetov*), Department of Mathematic - Univesity of Bologna, Italy  
(Course for PhD students: 36 hours)

- [Seminars](#)

- March 13, 2023 **"Metrics on the phase space and well-posedness for degenerate Schrödinger equations"** (*Prof. J.Delgado*), Ghent Geometric Analysis Seminar at Ghent Analysis & PDE Center - Ghent University , Belgium
- January 30, 2023 **"Index theory via Lie groupoids"** (*Prof. C.Debord*), Ghent Geometric Analysis Seminar at Ghent Analysis & PDE Center - Ghent University , Belgium
- August-December, 2022 **"Ghent Methusalem Junior Seminar (Fall 2022)"**, Ghent Analysis & PDE Center - Ghent University, Belgium, (on-line)
- October 31, 2022 **"Estimates for eigenfunctions of elliptic operators on compact manifolds and applications to control theory"** (*Prof. D.Cardona*), Ghent Geometric Analysis Seminar at Ghent Analysis & PDE Center - Ghent University , Belgium
- October 3-10, 2022 **"The integral in Noncommutative Geometry"** (*Prof. Gihyun Lee*), Ghent Geometric Analysis Seminar at Ghent Analysis & PDE Center - Ghent University , Belgium
- August 22, 2022 **"The infinity-Laplacian relative to vector fields"** (*Prof. J.Manfredi*), Department of Mathematics - Univeristy of Bologna, Italy
- July 28, 2022 **"The Alt-Phillips functional for negative powers"** (*Prof. D.De Silva*), Department of Mathematics - Univeristy of Bologna, Italy
- July 27-29, 2022 **Seminar series - "Regularity Theory for elliptic equation"** (*Prof. D.De Silva*), Department of Mathematics - Univeristy of Bologna, Italy
- June 20, 2022 **"Analytic microlocal analysis with exponential weights and some applications"** (*Prof. J.Sjostrand*), Ghent Methusalem Colloquium at Ghent Analysis & PDE Center - Ghent University , Belgium

- June 13, 2022 **"Analysis on non-compact manifolds and index theory"** (*Prof. V.Nistor*), *Ghent Methusalem Colloquium at Ghent Analysis & PDE Center - Ghent University*, Belgium
- May 30, 2022 **"A new approach to the hot spots conjecture"** (*Prof. J.Rohleder*), *Ghent Methusalem Colloquium at Ghent Analysis & PDE Center - Ghent University*, Belgium
- May 19, 2022 **"Geometric measure theory in Carnot groups and intrinsic submanifolds"** (*Prof. B.Franchi*), *Department of Mathematics - Univeristy of Bologna, Italy, (on-line)*
- April 20, 2022 **"Estimates for pseudodifferential operators in terms of the norms of Fourier multipliers"** (*Prof. E.Shargorodsky*), *Ghent Methusalem Colloquium at Ghent Analysis & PDE Center - Ghent University, Belgium*
- April 20, 2022 **"Convolution Equations on Lie Groups and Their Applications"** (*Prof. R.Duduchava*), *Ghent Methusalem Colloquium at Ghent Analysis & PDE Center - Ghent University*, Belgium
- March 17, 2022 **"Propagation of singularities in subelliptic PDEs"** (*Prof. C.Letrouit*), *Department of Mathematics - Univeristy of Bologna, Italy*
- February-June, 2022 **"Ghent Methusalem Junior Seminar (Spring 2022)"**, *Ghent Analysis & PDE Center - Ghent University, Belgium, (on-line and in person)*
- January 27, 2022 **"On the regularity of solutions and of analytic vectors for 'sums of equations' "** (*Prof. G.Chinni*), *Department of Mathematics - Univeristy of Bologna, Italy, (on-line)*
- December 17, 2021 **"On pseudo-Heisenberg type Lie Algebra"** (*Prof. I.Markina*), *Department of Mathematics - Univeristy of Bologna, Italy, (on-line)*
- November 15, 2021 **"Some developments in preconditioning time-dependent PDE-constrained optimization problems and multiple saddle point systems"** (*Prof. J.Pearson*), *Department of Mathematics, Univeristy of Bologna, Italy, (on-line)*
- October 18, 2021 **"Halmos' invariant subspace problem and local spectral theory"** (*Prof. J.Gonzalez*), *Department of Mathematics - Univeristy of Bologna, Italy*
- October 28, 2021 **"Phase space analysis of wick operators on Bargman with application to discrete NLS"** (*Prof. L.Zanelli*), *Department of Mathematics - Univeristy of Bologna, Italy*
- August-December, 2021 **"Ghent Methusalem Junior Seminar (Fall 2021)"**, *Ghent Analysis & PDE Center - Ghent University, Belgium (on-line)*
- April 29, 2021 **"Quotients and parameterizations"** (*Prof. L.Migliorini*), *Department of Mathematics - Univeristy of Bologna, Italy, (on-line)*
- February-June, 2021 **"Ghent Methusalem Junior Seminar (Spring 2021)"**, *Ghent Analysis & PDE Center - Ghent University, Belgium, (on-line)*
- April 27-28, 2020 **Seminar series - "Mathematical Methods and Models in Machine Learning"**, *Department of Mathematics - Univeristy of Bologna, Italy, (on-line)*
- June 27, 2019 **Lectio Magistralis - "Optimal mathematics"** (*Prof. A.Figalli*), *"Accademia delle Scienze dell'Istituto di Bologna" - Univeristy of Bologna, Italy*

- May 13-24, 2019 **Seminar series - "Topics in Global analysis" (Prof. G.Mendoza )**,  
*Department of Mathematics - Univeristy of Bologna, Italy*
- April 17, 2019 **"Calculus, heat flow, optimal transport and curvature-dimension  
bounds in metric measure space" (Prof. L.Ambrosio)**, *Department of  
Mathematics - Univeristy of Bologna, Italy*
- Dicember 21, 2018 **"The many faces of dispersive equations" (Prof. G.Staffilani)**, *Depart-  
ment of Mathematics - Univeristy of Bologna, Italy*
- April, 2016 **Seminar series -"Green's functions in physics / Rotations and angular  
momentum in classical and quantum physics" (Prof. E.Ercolessi)**,  
*Collegio Superiore - Univeristy of Bologna, Italy, (8 hours)*

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## Languages

- Italian Mother tongue  
English Advanced C1