

# Luigi PROVENZANO

## PERSONAL DATA

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PLACE AND DATE OF BIRTH: Casarano (LECCE), Italy | May 4, 1987  
CITIZENSHIP: Italian  
PHONE: +39 349 1324373

## CURRENT POSITION

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OCT. 2020–PRESENT | **RTDB MAT/03**,  
Dipartimento di Scienze di Base e Applicate per l'Ingegneria -SBAI  
Sapienza Università di Roma (Italy)  
Email: [luigi.provenzano@uniroma1.it](mailto:luigi.provenzano@uniroma1.it)

## PAST POSITIONS

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FEB. 2018–JAN. 2020 | **Assegnista di ricerca senior (tipo b) - PostDoc**,  
*Dipartimento di Matematica "Tullio Levi-Civita"*, **DM**  
Università degli Studi di Padova (Italy)

JUL. 2016–JAN. 2018 | **Chercheur avancé - PostDoc**,  
SB MATH SCI-SB-JS, **SCI-SB-JS Group**  
EPFL - École Polytechnique Fédérale de Lausanne (Switzerland)

MAY 2016–JUN. 2016 | **Collaborateur Scientifique - PostDoc**,  
*Institut de Mathématiques*, Université de Neuchâtel  
Neuchâtel (Switzerland)

JAN. 2013–DEC. 2015 | **Ph.D Student**  
*Dipartimento di Matematica*, Università degli Studi di Padova  
Padova (Italy)

## DEGREES AND DIPLOMAS

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JAN. 2013–DEC. 2015 | Ph.D in MATHEMATICS, **Università degli Studi di Padova**  
Judgement: "*excellent*"  
Supervisor: Prof. Pier Domenico LAMBERTI  
Ph.D thesis: "On mass distribution and concentration phenomena for linear elliptic partial differential operators"

JAN. 2010–MAR. 2012 | Master degree in MATHEMATICS  
Grade 110/110 "*cum laude*", **Università degli Studi di Padova**  
Supervisor: Prof. Pier Domenico LAMBERTI  
Master thesis: "Eigenvalues of harmonic and poly-harmonic operators subject to mass density perturbations"

SEPT. 2006–DEC. 2009 | Bachelor degree in MATHEMATICS  
Grade 106/110, **Università degli Studi di Padova**  
Supervisor: Prof. Pier Domenico LAMBERTI  
Bachelor thesis: "Sulla dipendenza dello spettro di una membrana vibrante dalla densità di massa"

SEPT. 2001–JUN. 2006 | High school degree, **Liceo Scientifico "G. C. Vanini"**, Casarano (LECCE)  
Grade: 100/100 "*with merit*".

## OTHER EXPERIENCES ABROAD

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OCT. 2014–JAN. 2015	Research period at the <b>Universidade de AVEIRO</b> , Portugal Ph.D exchange program, supervision of Prof. Matteo Dalla Riva.
MAY 2012–AUG. 2012	Research period at the <b>BCAM</b> of BILBAO, Spain ERC project NUMERIWAVES, supervision of Prof. Enrique Zuazua.
SEPT. 2010–JUN. 2011	Erasmus at <b>Université Denis Diderot-Paris 7</b> , PARIS, France.

## RESEARCH INTERESTS

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Mathematical Analysis and Geometry: spectral perturbation problems, spectral theory, spectral geometry, shape optimization, functional analysis, asymptotic analysis, partial differential equations, Riemannian geometry.

## RESEARCH ACTIVITY

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Spectral perturbation problems for elliptic operators with particular concern to problems of perturbation of mass density or shape. Mass concentration problems and asymptotic analysis. Shape optimization and isoperimetric and functional inequalities for the eigenvalues of differential operators. Geometric estimates for eigenvalues of differential operators on Riemannian manifolds. Inequalities for sums and Riesz-means of eigenvalues and semiclassical asymptotics. Inequalities for Steklov eigenvalues. Higher order Steklov problems and trace theorems. Isoparametric foliations and overdetermined problems. Magnetic Laplacian. Thin domains.

## PUBLICATIONS

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### PUBLICATIONS IN SCIENTIFIC JOURNALS

1. L. Provenzano, “*Upper bounds for the Steklov eigenvalues of the  $p$ -Laplacian*”, *Mathematika*, in press (2021).
2. D. Buoso, P. Luzzini, L. Provenzano, J. Stubbe, “*On the spectral asymptotics for the buckling problem*”, *J. Math. Phys.* 62 (2021), no. 12, Paper No. 121501.
3. B. Colbois, L. Provenzano, “*Conformal upper bounds for the eigenvalues of the  $p$ -Laplacian*”, *Journal of the London Mathematical Society*, <https://doi.org/10.1112/jlms.12493>, (2021), in press.
4. P.D. Lamberti, L. Provenzano, “*On the explicit representation of the trace space  $H^{\frac{3}{2}}$  and of the solutions to biharmonic Dirichlet problems on Lipschitz domains via multi-parameter Steklov problems*”, *Revista Matemática Complutense*, <https://doi.org/10.1007/s13163-021-00385-z> (2021), in press.
5. P.D. Lamberti, L. Provenzano, “*On Trace Theorems for Sobolev Spaces*”, *Le Matematiche*, Volume 75, Issue 1 (2020), 137–175.
6. E. Harrell II, L. Provenzano, J. Stubbe, “*Complementary asymptotically sharp estimates for eigenvalue means of Laplacians*”, *International Mathematics Research Notices* (2019), in press.
7. L. Provenzano, “*Inequalities between Dirichlet and Neumann eigenvalues of the Polyharmonic operators*”, *Proceedings of the American Mathematical Society* 147 (2019), no. 11, 4813–4821.
8. L. Provenzano, J. Stubbe, “*Weyl-type bounds for Steklov eigenvalues*”, *Journal of Spectral Theory* 9 (2019), no. 1, 349–377.

9. D. Buoso, L.M. Chasman, L. Provenzano, “*On the stability of some isoperimetric inequalities for the fundamental tones of free plates*”, *Journal of Spectral Theory* 8 (2018), no. 3, 843–869.
10. M. Dalla Riva, L. Provenzano, “*On vibrating thin membranes with mass concentrated near the boundary: an asymptotic analysis*”, *SIAM Journal on Mathematical Analysis* 50 (2018), no. 3, 2928–2967.
11. B. Colbois, L. Provenzano, “*Eigenvalues of elliptic operators with density*”, *Calculus of Variations and Partial Differential Equations* 57 (2018), no. 2, Art. 36.
12. L. Provenzano, “*A note on the Neumann eigenvalues of the biharmonic operator*”, *Mathematical Methods in the Applied Sciences, Math. Methods Appl. Sci.* 41 (2018), no. 3, 1005–1012.
13. P.D. Lamberti, L. Provenzano, “*Neumann to Steklov eigenvalues: asymptotic and monotonicity results*”, *Proceedings of the Royal Society of Edinburgh, Section: A Mathematics, Volume 147, Issue 2* (2017), 429–447.
14. L. Andreis, D. Barbato, F. Collet, M. Formentin, L. Provenzano, “*Strong existence and uniqueness of the stationary distribution for a stochastic inviscid dyadic model*”, *Nonlinearity, Volume 29, Issue 3* (2016), 1156–69.
15. D. Buoso, L. Provenzano, “*A few shape optimization results for a biharmonic Steklov problem*”, *J. Differential Equations, Volume 259, Issue 5* (2015), 1778–1818.
16. P.D. Lamberti, L. Provenzano, “*A maximum principle in spectral optimization problems for elliptic operators subject to mass density perturbations*”, *Eurasian Mathematical Journal, Volume 4, Issue 3* (2013), 70–83.

#### PUBLICATIONS IN BOOKS AND PROCEEDINGS

17. D. Buoso, L. Provenzano, “*On the eigenvalues of a biharmonic Steklov problem*”, *Integral Methods in Science and Engineering, Theoretical and Computational Advances*, 81–89, Birkhäuser, (2015).
18. P.D. Lamberti, L. Provenzano, “*Viewing the Steklov eigenvalues of the Laplace operator as critical Neumann eigenvalues*”, *Current Trends in Analysis and Its Applications, Proceedings of the 9th ISAAC Congress, Kraków 2013* 171–178, Birkhäuser, Basel (2015).

#### SUBMITTED PAPERS

19. B. Colois, L. Provenzano, A. Savo, “*Isoperimetric inequalities for the first Aharonov-Bohm eigenvalue of the Neumann and Steklov problems*” (2022).
20. L. Provenzano, A. Savo, “*Isoparametric foliations and the Pompeiu property*” (2021).
21. F. Ferraresso, L. Provenzano, “*On the eigenvalues of the biharmonic operator with Neumann boundary conditions on a thin set*” (2021).
22. D. Buoso, L. Provenzano, J. Stubbe, “*Semiclassical bounds for spectra of biharmonic operators*” (2019).
23. B. Colbois, L. Provenzano, “*Neumann eigenvalues of the biharmonic operator on domains: geometric bounds and related results*” (2019).

## OTHER PUBLICATIONS

24. L. Provenzano, “On mass distribution and concentration phenomena for linear elliptic partial differential operators”, tesi di dottorato, <http://paduaresearch.cab.unipd.it/9188/>

## SCIENTIFIC DISSEMINATION

25. L. Provenzano, “Nascita di un fungo matematico: dall’esperimento alla dimostrazione rigorosa”, in the study “Funghi matematici e Matematica come scienza semi-empirica” with P.D. Lamberti and P. Toni, Nuova Secondaria, Fascicolo 2, Ottobre 2021.

## ORGANIZATION OF CONFERENCES AND SEMINARS

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SEPT. 9-11, 2019	<b>Organizer</b> of the “Workshop on Spectral Geometry and Analysis of Differential Operators”, Padova (Italy) with P.D. Lamberti and P. Musolino.
JUN. 24-28, 2019	<b>Assistant</b> in the organization of the “Mini-courses in Mathematical Analysis 2019”, Padova (Italy).
JUL. 25-29, 2016	<b>Assistant</b> in the organization of the “14th International Conference on Integral Methods in Science and Engineering (IMSE 2016)”, Padova (Italy)
SEPT. 2016-JAN. 2018	<b>Organizer</b> of the cycle of seminars on the topic “SPECTRAL THEORY AND GEOMETRY”, EPFL, with K. Gittins.

## CONFERENCE TALKS

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SEPT. 30-OCT. 4, 2019	Asymptotic Analysis & Spectral Theory, PARIS SUD - ORSAY (France)
SEPT. 23-27, 2019	Shape Optimization and Isoperimetric and Functional Inequalities, LEVICO TERME (Italy)
FEB. 4-8, 2019	XXIX Convegno Nazionale di Calcolo delle Variazioni, LEVICO TERME (Italy)
JUL. 2-7, 2018	Mini-Courses in Mathematical Analysis, PADOVA (Italy)
JUN. 19-23, 2017	Workshop on Geometric Spectral Theory, NEUCHÂTEL (Switzerland)
JUN. 12-16, 2017	Mini-Courses in Mathematical Analysis, PADOVA (Italy)
JUN. 27-JUL. 01, 2016	Mini-Courses in Mathematical Analysis, PADOVA (Italy)
FEB. 8-12, 2016	School and Workshop PDEs and Applications, NAPOLI (Italy)
AUG. 30-SEPT. 1, 2015	Modern Mathematical Methods in Science and Technology (M3ST) 2015, KALAMATA (Greece)
JUL. 6-10, 2015	EquaDiff 2015, LYON (France)
NOV. 6-7, 2014	Perturbation, Elliptic and Parabolic workshop, AVEIRO (Portugal)
OCT. 3-5, 2014	5th Iberian Mathematical Meeting, AVEIRO (Portugal)
JUL. 21-25, 2014	IMSE 2014, KARLSRUHE (Germany)
AUG. 5-10, 2013	Isaac 9th Congress KRAKOW (Poland)

## INVITED TALKS

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NOVEMBER 18, 2021	Invited seminar “Seminario di Algebra e Geometria”, Università degli Studi dell’Aquila, L’AQUILA (Italy)
APRIL 15, 2021	Invited seminar “ $P(n)/N(p)$ ”, Department of Mathematics Guido Castelnuovo, Sapienza Università di Roma, ROMA (Italy)
FEBRUARY 1, 2021	Invited online seminar “Spectral geometry in the clouds”, Université Laval MONTREAL (Canada) and UCL LONDON (UK)
SEPTEMBER 8, 2020	Invited seminar, SBAI, Sapienza Università di Roma, ROMA (Italy)
FEBRUARY 20, 2020	Invited seminar, Politecnico di Torino, TORINO (Italy)
APRIL 10, 2019	Invited seminar, Università di Roma La Sapienza, ROMA (Italy)
MAY 8, 2018	Invited seminar, University of Bern, BERN (Switzerland)
OCTOBER 4, 2016	Invited seminar, Université Paris 13, PARIS (France)
JANUARY 13, 2016	Invited seminar, Université de Neuchâtel, NEUCHÂTEL (Switzerland)
JULY 3, 2015	Invited seminar, Politecnico di Torino, TORINO (Italy)

## TEACHING ACTIVITY

A.A. 2021–2022	Ph.D course “ <b>Spectral geometry of the Laplace operator</b> ”, 12 hours ( <b>scheduled</b> ), Sapienza Università di Roma, Ph.D program in Mathematical Models for Engineering, Electromagnetics and Nanosciences, spring semester.
A.A. 2021–2022	Professor of the course “ <b>Geometria</b> ”, 90 hours, Sapienza Università di Roma, Bachelor in Aerospace Engineering (fall semester).
A.A. 2020–2021	Professor of the course “ <b>Geometria</b> ”, 90 hours, Sapienza Università di Roma, Bachelor in Mechanical Engineering (fall semester).
A.A. 2019–2020	Professor of the course “ <b>Analisi Matematica 1</b> ”, 50 hours, with responsibility Università degli Studi di Padova, Bachelor in Information Engineering (fall semester). Students evaluation: <b>mean</b> 8.53/10, <b>median</b> 9/10.
A.A. 2018–2019	Professor of the course “ <b>Analisi Matematica 1</b> ”, 40 hours Università degli Studi di Padova, Bachelor in Energy and Mechanical Engineering (fall semester). Students evaluation (Energy Eng.): <b>mean</b> 8.59/10, <b>median</b> 9/10, Students evaluation (Mechanical Eng.): <b>mean</b> 8.77/10, <b>median</b> 9/10.
A.A. 2017–2018	Assistant for the course “ <b>Analyse Avancée I</b> ”, 56 hours EPFL, Bachelor in Physics (fall semester).
A.A. 2016–2017	Assistant for the course “ <b>Analyse Avancée I et II</b> ”, 112 hours EPFL, Bachelor in Physics (fall and spring semester).
A.A. 2015–2016	Teaching assistant for the course “ <b>Analisi Matematica 1</b> ”, 50 hours Università degli Studi di Padova, Bachelor in Mathematics.
A.A. 2015–2016	Teacher of the “ <b>Precorso di Calcolo</b> ” MOOC of the University of Padova on <i>Iversity</i> and <i>Eduopen</i> .
A.A. 2014–2015	Professor of the course “ <b>Precorso di Matematica</b> ”, 20 hours Università degli Studi di Padova, Bachelor in Statistics (first semester).
A.A. 2013–2014	Teaching assistant for the course “ <b>Analisi Matematica 2</b> ”, 25 hours Università degli Studi di Padova, Bachelor in Mathematics (second semester).
APR 1 AND 8, 2016 MAY 8 AND 15, 2015	Teacher of the mini-courses “ <b>Introduzione a Matematica</b> ”, 12 hours Università degli Studi di Padova, Bachelor in Physics and Astronomy.
2012–2015	Other teaching assistance activities, Università degli Studi di Padova.

## RESEARCH PROJECTS AND FUNDINGS

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2021	Progetto di Ateneo - Sapienza Università Roma “Esistenza, unicità e proprietà qualitative di soluzioni di equazioni differenziali su varietà Riemanniane” (participant).
2019	GNAMPA research project (INDAM) “Analisi spettrale per operatori ellittici del secondo e quarto ordine con condizioni al contorno di tipo Steklov o di tipo parzialmente incernierato” (participant).
2019	Research grant Type B - sostegno di ricerche di carattere innovativo e di eccellenza proposte da giovani non strutturati “Eigenvalue bounds for the Laplacian and related operators” (p.i.).
2015	GNAMPA research project (INDAM) “Un approccio funzionale analitico per problemi di perturbazione singolare e di omogeneizzazione” (participant).
2012	ERC advanced grant “NUMERIWAVES” FP7-246775 (participant).
2012	Ph.D scholarship, Università degli Studi di Padova
2012	Progetto di Ateneo - Università degli Studi di Padova “Singular perturbation problems for differential operator” (participant).

## OTHER ACTIVITIES

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- Reviewer for scientific journals: *Journal of Geometric Analysis*, *Canadian Mathematical Bulletin*, *Philosophical Transaction of the Royal Society A*, *Differential Geometry and its Applications*, *Bulletin of the Belgian Mathematical Society – Simon Stevin*, *Eurasian Mathematical Journal*, etc.
- Reviewer for zbMATH and Mathematical Reviews.
- Qualification 2017 Maître de Conference N.17225302724 (Mathématiques) - France, Campaign 2017.
- Qualification 2017 Maître de Conference N.17226302724 (Mathématiques appliquées et applications des mathématiques), France, Campaign 2017.
- Scientific visits at EPFL (Lausanne) and University of Neuchâtel, 2017-2020.
- Redaction of the texts for the MOOC “*Matematica di base*” of the University of Napoli Federico II, CISIA (2018), direction of C. Mariconda and A. Tonolo (Univ. Padova).

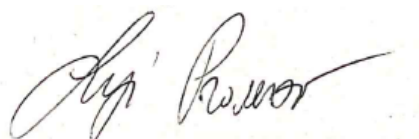
## PARTICIPATION AT INTERNATIONAL CONFERENCES (WITHOUT CONTRIBUTIONS)

JUN. 21-25, 2021	Online Mini-courses in Mathematical Analysis, PADOVA (Italy)
SEPT. 14-17, 2020	Online Mini-courses in Mathematical Analysis, PADOVA (Italy)
APR. 3-7, 2017	Spectral Days, STUTTGART (Germany)
NOV. 21-25, 2016	Shape optimization and Isoperimetric and Functional Inequalities, CIRM MARSEILLE (France)
SEPT. 17-18, 2015	Modelli Matematici per Ponti Sospesi, TORINO (Italy)
JUN. 22-26, 2015	Mini-Courses in Mathematical Analysis, PADOVA (Italy)
FEB. 9-13, 2015	Spectral theory and shape optimization problems for elliptic PDEs , MILANO (Italy)
FEB. 2-6, 2015	XXV Convegno Nazionale di Calcolo delle Variazioni , LEVICO TERME
JUN. 30- JUL. 4, 2014	First Joint International Meeting RSME-SCM-SEMA-SIMAI-UMI , BILBAO (Spain)
JUN. 23-27, 2014	Mini-courses in Mathematical Analysis , PADOVA (Italy)
FEB. 20-21, 2014	Workshop on Partial Differential Equations and Applications , PISA (Italy)
JAN. 27-31, 2014	XIV Convegno Nazionale di Calcolo delle Variazioni, LEVICO TERME (Italy)
NOV. 21-23, 2013	New Trends in Calculus of Variations, NAPOLI (Italy)
SEPT. 23-27, 2013	Workshop in New Trends in Shape Optimization, ERLANGEN (Germany)
SEPT. 5-7, 2013	Third workshop on thin structures , NAPOLI (Italy)
JUN. 10-14, 2013	Mini-courses in Mathematical Analysis , PADOVA (Italy)
JUN. 8-9, 2012	European Finite Element Fair , BILBAO (Spain)
JUN. 13-17, 2011	Mini-courses in Mathematical Analysis , PADOVA (Italy)

## LANGUAGES

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ITALIAN:	mother tongue
ENGLISH:	fluent
FRENCH:	fluent
SPANISH:	basic
PORTUGUESE:	basic



Updated January 30, 2022.

Il sottoscritto Luigi Provenzano, ai sensi del Dlgs 196/03, autorizza espressamente l'utilizzo dei dati personali e professionali riportati nel curriculum. Il sottoscritto Luigi Provenzano, consapevole che chiunque rilascia dichiarazioni mendaci è punito ai sensi del codice penale e delle leggi speciali in materia, ai sensi degli artt. 46 e 47 del D.P.R. 28 Dicembre 2000, n.445 e successive modificazioni e integrazioni, dichiara che quanto riportato nel presente curriculum corrisponde a verità.