

**PROCEDURA PUBBLICA DI SELEZIONE PER L'ASSUNZIONE DI N.1 RICERCATORE A TEMPO DETERMINATO AI SENSI DELL'ART.24, COMMA 3, LETT. B) DELLA LEGGE 240/2010 PER IL SETTORE CONCURSALE 01/A3 - SETTORE SCIENTIFICO DISCIPLINARE MAT/05 - Analisi Matematica- DIPARTIMENTO DI MATEMATICA E FISICA - UNIVERSITA' ROMA TRE .**

## **VERBALE N. 2**

### **ALLEGATO A**

***(elenco pubblicazioni presentate dai candidati)***

ELENCO DELLE PUBBLICAZIONI E DELLA TESI DI DOTTORATO PRESENTATE

Nome file	Descrizione
01_PhDThesis	Tesi di dottorato
02_abstract_tesi_dottorato	Pubblicazione abstract tesi di dottorato in rivista: M. M. Baldi. Generalized bin packing problems. 4OR, 12(3):293–294, 2014.
03_Kaniadakis2020	Articolo sottomesso in rivista e disponibile su archivio online ( <a href="https://www.researchsquare.com/article/rs-35370/v1">https://www.researchsquare.com/article/rs-35370/v1</a> ): G. Kaniadakis, M.M. Baldi, Th.S. Deisboeck, G. Grisolia, S.M. Scarfone, A. Sparavigna, and U. Lucia. The k-statistics approach to epidemiology.
04_RBMA	Articolo accettato alla pubblicazione: M. M. Baldi, E. Fersini, and E. Messina. Relational bayesian model averaging for sentiment analysis in social networks. In G. Nicosia, P. Pardalos, G. Giuffrida, R. Umeton, and V. Sciacca, editors, The 6th International Conference on machine Learning, Optimization and Data science - LOD 2020, Lecture Notes in Computer Science. Springer.
05_Sparavigna2016	Pubblicazione: A. C. Sparavigna and M. M. Baldi. Symmetry and the golden ratio in the analysis of a regular pentagon. International Journal of Mathematical Education in Science and Technology, pages 1–11, 2016.
06_Baldi2016	Pubblicazione: M. M. Baldi and M. Bruglieri. On the generalized bin packing problem. ITOR, 24:425–438, 2017.
07_Baldi2016d	Pubblicazione: M. M. Baldi, G. Perboli, and R. Tadei. Driver maneuvers inference through machine learning. In Machine Learning, Optimization, and Big Data, pages 182–192. Springer International Publishing, 2016
08_Tadei2012	Pubblicazione: R. Tadei, G. Perboli, and M. M. Baldi. The capacitated transshipment location problem with stochastic handling costs at the facilities. ITOR, 19(6):789–807, 2012
09_Sparavigna2016bis	Pubblicazione: A. C. Sparavigna and M. M. Baldi. A study of the regular pentagon with a classic geometric approach, 2016. <a href="https://hal.archives-ouvertes.fr/hal-01295771">https://hal.archives-ouvertes.fr/hal-01295771</a>
10_Baldi2013b	Pubblicazione: M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. Asymptotic results for the generalized bin packing problem. Procedia - Social and Behavioral Sciences, 111:663–671, 2013.
11_Perboli2012	Pubblicazione: G. Perboli, R. Tadei, and M. M. Baldi. The stochastic generalized bin packing problem. DAMath, 160:1291–1297, 2012
12_Baldi2015	Pubblicazione: M. M. Baldi, F. Heinicke, A. Simroth, and R. Tadei. New heuristics for the stochastic tactical railway maintenance problem. Omega, 63(C):94–102, 2016.
13_Baldi2019	Pubblicazione: M. M. Baldi, D. Manerba, G. Perboli, and R. Tadei. A generalized bin packing problem for parcel delivery in last-mile logistics. European Journal of Operational Research, 274:990–999, 2019
14_Baldi2012e	Pubblicazione: M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. Branch-and-price and beam search algorithms for the variable cost and size bin packing problem with optional items. AnnalsOR, 222(1):125–141, 2014.
15_Baldi2012a	Pubblicazione: M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. The generalized bin packing problem. Transportation Research Part E, 48(6):1205–1220, 2012
16_Baldi2012b	Pubblicazione: M. M. Baldi, G. Perboli, and R. Tadei. The three-dimensional knapsack problem with balancing constraints. Applied Mathematics and Computation, 218(19):9802–9818, 2012
17_SSRN	Pubblicazione: A. C. Sparavigna and M. M. Baldi. A mathematical study of a symbol: the vesica piscis of sacred geometry. Philica, (560), Distribuito in SSRN AESTHETICS & PHILOSOPHY OF ART eJOURNAL, Vol. 8, No. 6: Mar 22, 2016.

## Gabriele Benedetti – Pubblicazioni presentate

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1. G. Benedetti and J. Kang, *On a local systolic inequality for odd-symplectic forms*, Portugaliae Mathematica, preprint at arXiv:1902.01261, 52 pages (acceptance letter attached).
2. G. Benedetti and A. F. Ritter, *Invariance of symplectic cohomology and twisted cotangent bundles over surfaces*, International Journal of Mathematics, preprint at arXiv:1807.02086, 42 pages (acceptance letter attached).
3. G. Benedetti and J. Kang, *A local contact systolic inequality in dimension three*, Journal of the European Mathematical Society, preprint at arXiv:1902.01249, 43 pages (acceptance letter attached).
4. L. Asselle and G. Benedetti, *Integrable magnetic flows on the two-torus: Zoll examples and systolic inequalities*, Journal of Geometric Analysis (2020), doi:10.1007/s12220-020-00379-1.
5. L. Asselle, G. Benedetti, and M. Mazzucchelli, *Minimal boundaries in Tonelli Lagrangian systems*, International Mathematical Research Notices (2019), doi:10.1093/imrn/rnz246.
6. A. Abbondandolo, L. Asselle, G. Benedetti, M. Mazzucchelli, and I. A. Taimanov, *The multiplicity problem for periodic orbits of magnetic flows on the 2-sphere*, Advanced Nonlinear Studies **17** (2017), no. 1, 17–30.
7. L. Asselle and G. Benedetti, *On the periodic motions of a charged particle in an oscillating magnetic field on the two-torus*, Mathematische Zeitschrift **286** (2017), no. 3-4, 843–859.
8. G. Benedetti, *Magnetic Katok examples on the two-sphere*, Bulletin of the London Mathematical Society **48** (2016), no. 5, 855–865.
9. L. Asselle and G. Benedetti, *The Lusternik-Fet theorem for autonomous Tonelli Hamiltonian systems on twisted cotangent bundles*, Journal of Topology and Analysis **8** (2016), no. 3, 545–570.
10. G. Benedetti, *The contact property for symplectic magnetic fields on  $S^2$* , Ergodic Theory and Dynamical Systems **36** (2016), no. 3, 682–713.
11. G. Benedetti and K. Zehmisch, *On the existence of periodic orbits for magnetic systems on the two-sphere*, Journal of Modern Dynamics **9** (2015), 141–146.
12. L. Asselle and G. Benedetti, *Infinitely many periodic orbits of non-exact oscillating magnetic fields on surfaces with genus at least two for almost every low energy level*, Calculus of Variations and Partial Differential Equations **54** (2015), no. 2, 1525–1545.

PhD Thesis G. Benedetti, *The contact property for magnetic flows on surfaces*, doi.org/10.17863/CAM.16235, University of Cambridge, 2015.

Last updated: July 4, 2020

## Pubblicazioni

1. B.C., Luca Fanelli, *Sharp Hardy uncertainty principle and gaussian profiles of covariant Schrödinger evolutions*, Transactions of the American Mathematical Society 367, 3 (2015) 2213-2233, Publisher: American Mathematical Society, DOI: 10.1090/S0002-9947-2014-06383-6.
2. B.C., Mirko Tarulli,  *$H^1$ -scattering for systems of  $N$ -defocusing weakly coupled NLS equations in low space dimensions*, Journal of Mathematical Analysis and Applications 430, 1 (2015) 528-548, Publisher: Academic Press Inc., DOI: 10.1016/j.jmaa.2015.05.008.
3. Andrea Braides, B.C., Adriana Garroni, David Sarrocco, *Quasi-static damage evolution and homogenization: A case study of non-commutability*, Annales de l'Institut Henri Poincaré (C) Non Linear Analysis 33, 2 (2016) 309-328, Publisher: Elsevier Masson SAS, DOI: 10.1016/j.anihpc.2014.10.003.
4. B.C., Piero D'Ancona, *Scattering in the energy space for the NLS with variable coefficients*, Mathematische Annalen 366, 1-2 (2016) 479-543, Publisher: Springer New York LLC, DOI: 10.1007/s00208-015-1335-4.
5. B.C., Luca Fanelli, *Gaussian decay of Harmonic Oscillators and related models*, Journal of Mathematical Analysis and Applications 456, 1 (2017) 214-228, Publisher: Academic Press Inc., DOI: 10.1016/j.jmaa.2017.06.067.
6. B.C., Fabio Pizzichillo, *Self-Adjoint Extensions for the Dirac Operator with Coulomb-Type Spherically Symmetric Potentials*, Letters in Mathematical Physics, Volume 108, Issue 12, 1 December 2018, Pages 2635-2667, Publisher: Springer Netherlands, DOI: 10.1007/s11005-018-1093-9.
7. B.C., Fabio Pizzichillo, *Boundary triples for the Dirac operator with Coulomb-type spherically symmetric perturbations*, Journal of Mathematical Physics, Volume 60, Issue 4, 1 April 2019, Article number 041502, Publisher: American Institute of Physics Inc., DOI: 10.1063/1.5063986.
8. B.C., Fabio Pizzichillo, Luis Vega, *A Hardy-type inequality and some spectral characterizations for the Dirac-Coulomb operator*, Revista Matemática Complutense Volume 33, Issue 1, 1 January 2020. Publisher: Springer, DOI: 10.1007/s13163-019-00311-4.
9. B.C., Orif O. Ibrogimov, David Krejčířík, František Štampach, *Location of eigenvalues of non-self-adjoint discrete Dirac operators*, Annales Henri Poincaré volume 21, pages 2193–2217, 8 June 2020, Publisher: Springer, DOI: 10.1007/s00023-020-00916-2.

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## Tesi di Dottorato

Title *Spacetime asymptotics for Schrödinger Equations*  
Date Dicembre 19, 2014  
Institution “Sapienza” – Università di Roma  
Supervisor Prof. Piero D’Ancona  
Description Sono discussi risultati per lo scattering di equazioni di Schrödinger con coefficienti variabili e per sistemi di equazioni di Schrödinger debolmente accoppiate. Inoltre, sono descritti risultati relativi al principio di indeterminazione di Hardy e al decadimento gaussiano di soluzioni dell’equazione di Schrödinger.

13 Luglio 2020

Azahara de la Torre Pedraza

## Elenco delle pubblicazioni presentate

- o. Tesi di dottorato:  
**On the fractional Yamabe problem with isolated singularities and related issues**,  
Universitat Politècnica de Catalunya, Barcelona
1. A. DelaTorre, M. del Pino, M.d.M González and J. Wei.,  
**Delaunay solutions for the fractional Yamabe problem**,  
*Mathematische Annalen* (2017),1-2, 597-626
2. A. DelaTorre and M.d.M González,  
**Isolated singularities for a semilinear equation with fractional Laplacian arising in conformal geometry**,  
*Revista Matemática Iberoamericana* 34 (2018), no. 4, 1645–1678.
3. W. Ao, A. DelaTorre, H. Chan, M. Fontelos, M.d.M González and J. Wei,  
**On higher dimensional singularities for the fractional Yamabe problem: a non-local Mazzeo-Pacard program**,  
*Duke Math. J.* 168 (2019), no. 17, 3297–3411.
4. A. DelaTorre , A. Hyder, L. Martinazzi and Y. Sire,  
**The non-local mean-field equation on an interval**,  
apparso online su *Communications in Contemporary Mathematics (CCM)*, 2019.
5. W. Ao, A. DelaTorre, M.d.M González and J. Wei,  
**A gluing approach for the fractional Yamabe problem with isolated singularities**,  
*Journal für die reine und angewandte Mathematik (Crelle journal)*, 2020 (763), 28-78 .
6. H. Chan, A. DelaTorre,  
**An analytic construction of singular solutions related to a critical Yamabe problem**,  
Apparso online in *Communications in Partial Differential Equations*, 2020.
7. A. DelaTorre and G. Mancini,  
**Improved Adams-type inequalities and their extremals in dimension  $2m$** ,  
accettato in *Communications in Contemporary Mathematics (CCM)*.
8. W. Ao, H. Chan, A. DelaTorre, M. Fontelos, M.d.M González and J. Wei,  
**ODE-methods in non-local equations**,  
accettato in *Journal of Mathematical Study*.
9. DelaTorre, G. Mancini and A. Pistoia,  
**Sign-changing solutions for the one-dimensional non-local sinh-Poisson equation**,  
accettato in *Advanced Nonlinear Studies*.
10. A. DelaTorre , M.d.M González, A. Hyder and L. Martinazzi,  
**Concentration phenomena for the fractional Q-curvature equation in dimension 3**,  
*preprint*.

## Elenco delle pubblicazioni presentate - Francesco Di Plinio

### TESI DI DOTTORATO

- Tesi dal titolo  *$L^p$  bounds for the directional Hilbert transform and endpoint estimates with application to Euler equations*. Indiana University, Dicembre 2012. Advisors Prof. C. Demeter and R. Temam

### PUBBLICAZIONI

1. F. Di Plinio and C. Thiele, *Endpoint bounds for the bilinear Hilbert transform*, **Trans. Amer. Math. Soc.** **368** (2016), no. 6, 3931–3972. [MR3453362](#)
2. F. Di Plinio and R. Temam, *Grisvard's shift theorem near  $L^\infty$  and Yudovich theory on polygonal domains*, **SIAM J. Math. Anal.** **47** (2015), no. 1, 159–178. [MR3296605](#)
3. F. Di Plinio and A. K. Lerner, *On weighted norm inequalities for the Carleson and Walsh-Carleson operators*, **J. London Math. Soc.** **90** (2014), no. 3, 654–674 [MR3291794](#)
4. J.M. Conde-Alonso, A. Culiuc, F. Di Plinio and Y. Ou, *A sparse domination principle for rough singular integrals*, **Analysis & PDE** **10** (2017), no. 5, 1255–1284
5. Y. Q. Do, F. Di Plinio and G. N. Uraltsev, *Positive sparse domination of variational Carleson operators*, **Annali Scuola Norm. Sup. (Scienze)** **18** (2018), no. 4, 1443–1458.
6. F. Di Plinio and Y. Ou, *A modulation invariant Carleson embedding theorem outside local  $L^2$* , **J. d'Analyse Mathématique** **135** (2018), no. 2, 675–711.
7. F. Di Plinio and I. Parissis, *A sharp estimate for the Hilbert transform along higher order lacunary directions*, **Israel J. Math.** **227** (2018), no. 1, 189–214.
8. F. Di Plinio and Y. Ou, *Banach-valued multilinear singular integrals*, **Indiana Univ. Math. J.** **67** (2018), no. 5, 1711–1763.
9. A. Culiuc, F. Di Plinio and Y. Ou, *Uniform sparse domination of singular integrals via dyadic shifts*, **Math. Res. Lett.** **25** (2018), no.1, 21–42
10. A. Culiuc, F. Di Plinio and Y. Ou, *Domination of multilinear singular integrals by positive sparse forms*, **J. London Math. Soc.** **98** (2018) no. (2) 369–392.
11. F. Di Plinio, I. Parissis, *On the maximal directional Hilbert transform in three dimensions*, in stampa, **Int. Math. Res. Not. IMRN.**, disponibile online a <https://doi.org/10.1093/imrn/rny138>, preprint [arXiv:1712.02673](#)
12. F. Di Plinio, K. Li, H. Martikainen, E. Vuorinen, *Multilinear operator-valued Calderón-Zygmund theory*, **J. Funct. Anal.** **279** (2020), no. 8, numerazione pagine da determinare

# List of Publications

ROBERTO FEOLA

PHD THESIS: “*Quasi-periodic solutions for fully nonlinear NLS*” Advisor: Michela Procesi.

## PUBLICATIONS.

1. **L. Corsi, R. Feola, G. Gentile**  
*Lower-dimensional invariant tori for perturbations of a class of non-convex Hamiltonian functions*,  
Journal of Statistical Physics 150(1) : 156-180 (2013).  
DOI: 10.1007/s10955-012-0682-8
2. **R. Feola, M. Procesi**  
*Quasi-periodic solutions for fully nonlinear forced reversible Schrödinger equations*,  
Journal of Differential equations, 259(7) : 3389–3447 (2015),  
DOI: 10.1016/j.jde.2015.04.025
3. **L. Corsi, R. Feola, M. Procesi**  
*Finite dimensional invariant KAM tori for tame vector fields*,  
Transactions of the Amer. Math. Soc. 372 : 1913-1983 (2019),  
DOI: <https://doi.org/10.1090/tran/7699>
4. **R. Feola, F. Iandoli**  
*Local well-posedness for quasi-linear NLS with large Cauchy data on the circle*,  
Annales de l’Institut Henri Poincaré C, Analyse non linéaire, 36(1) : 119-164 (2019),  
DOI: 10.1016/j.anihpc.2018.04.003
5. **R. Feola, F. Giuliani, S. Pasquali**  
*On the integrability of Degasperis-Procesi equation: Birkhoff resonances and strong stability*,  
Journal of differential Equations, 266(6) : 3390–3437 (2018),  
DOI: 10.1016/j.jde.2018.09.003
6. **R. Feola, F. Giuliani, M. Procesi**  
*Reducibility for a class of weakly dispersive linear operators arising from the Degasperis Procesi equation*,  
Dynamics of partial differential equations, 16(1) : 25–94 (2019),  
DOI: 10.4310/DPDE.2019.v16.n1.a2



7. **R. Feola, F. Giuliani, R. Montalto, M. Procesi**  
*Reducibility of first order linear operators on tori via Moser's theorem,*  
 Journal of Functional Analysis, 276(3) : 932-970 (2019),  
 DOI: 10.1016/j.jfa.2018.10.009
  
8. **R. Feola, F. Iandoli**  
*Long time existence for quasi-linear NLS with small Cauchy data on the circle,*  
 Annali della Scuola normale superiore di Pisa, Classe di scienze (2019),  
 DOI: 10.2422/2036-2145.201811\_003, arXiv:1806.03437
  
9. **R. Feola, B. Grebért**  
*Reducibility of Schrödinger equation on the Sphere,*  
 International Mathematics Research Notices (2020),  
 DOI: <https://doi.org/10.1093/imrn/rnz344>, arXiv: 1905.11964
  
10. **M. Berti, R. Feola, L. Franzoi**  
*Quadratic life span of periodic gravity-capillary water waves,*  
 Water Waves (2020),  
 DOI: <https://doi.org/10.1007/s42286-020-00036-8>
  
11. **R. Feola, F. Giuliani, M. Procesi**  
*Reducible KAM tori for Degasperis-Procesi equation,*  
 Comm. Math. Phys. 377 : 1681-1759 (2020),  
 DOI: <https://doi.org/10.1007/s00220-020-03788-z>
  
12. **R. Feola, B. Grebért, T. Nguyen**  
*Reducibility of Schrödinger equation on a Zoll manifold with unbounded potential.*  
 Journal of Mathematical Physics, 61, 071501 (2020)  
 DOI: <https://doi.org/10.1063/5.0006536>

## LIST OF PUBLICATIONS

DARIA GHILLI

### PUBLICATIONS

- 1) *Inverse problem in breaking line identification by shape optimization*, D. Ghilli, V. Kovtunen, K. Kunisch, Journal of Inverse and Ill-posed problems, in press 2019, DOI 10.1515/jiip-2019-0047.
- 2) *On a monotone scheme for nonconvex nonsmooth optimization with applications to fracture mechanics*, D. Ghilli, K. Kunisch, JOTA, Vol. 183, Issue 2, 609-641, 2019, DOI 10.1007/s10957-019-01545-4.
- 3) *Junction conditions for finite horizon optimal control problems on multi-domains with continuous and discontinuous solutions*, D. Ghilli, Z. Rao, H. Zidani, ESAIM:COCV, 2018, DOI 10.1051/cocv/2018072.
- 4) *On the monotone and primal dual active set schemes for  $\ell^p$ -type problems,  $p \in (0, 1]$* , D. Ghilli, K. Kunisch, Computational Optimization and Applications 72 (1), 45-85, 2018.
- 5) *Viscosity methods for large deviations estimates of multiscale stochastic processes*, D. Ghilli, ESAIM:COCV 24 (2), 605-637, 2018, DOI 10.1051/cocv/2017051.
- 6) *On Neumann problems for nonlocal Hamilton-Jacobi equations with dominating gradient terms*, D. Ghilli, Calculus of Variations and Partial Differential Equations 56:139, 2017, DOI 10.1007/s00526-017-1225-6.
- 7) *Quantitative Borell-Brascamp-Lieb inequalities for compactly supported power concave functions (and some applications)*, D. Ghilli, P. Salani, Journal of Convex Analysis 24 (3), 857-888, 2017.
- 8) *Large deviations for some fast stochastic volatility models by viscosity methods*, M. Bardi, A. Cesaroni, D. Ghilli, DCDS-A, 35 (9), 2015, DOI:10.3934/dcds.2015.35.3965.
- 9) *Stability of isoperimetric type inequalities for some Monge-Ampère functionals*, D. Ghilli, P. Salani, Annali di Matematica pura ed applicata, Vol. 193, Issue 3, 643-661, 2014, DOI 10.1007/s10231-012-0295-5.
- 10) *A monotone scheme for sparsity optimization in  $\ell^p$  with  $p \in (0, 1]$* , D. Ghilli, K. Kunisch, IFAC 2017 Proceeding.
- 11) *Some results in nonlinear PDEs: large deviations problems, nonlocal operators, and stability for some isoperimetric problems*, D. Ghilli, PhD thesis.

### PREPRINT SUBMITTED

- 1) *Periodic homogenization for weakly elliptic Hamilton-Jacobi-Bellman equations with critical fractional diffusion*, A. Ciomaga, D. Ghilli, E. Topp, Preprint 2020, submitted to Communications in Partial Differential Equations.

## Elenco delle Pubblicazioni e della Tesi di Dottorato presentate per la selezione

### Pubblicazioni:

- (1) A. Iacopetti, *Asymptotic analysis for radial sign-changing solutions of the Brezis-Nirenberg problem*, Annali di Matematica Pura ed Applicata, Vol. 194 Issue 6, 1649–1682 (2015).
- (2) A. Iacopetti, F. Pacella, *A nonexistence result for sign-changing solutions of the Brezis-Nirenberg problem in low dimensions*, Journal of Differential Equations, 258 no. 12, 4180–4208 (2015).
- (3) A. Iacopetti, G. Vaira, *Sign-changing tower of bubbles for the Brezis-Nirenberg problem*, Commun. Contemp. Math., **18** (2016), 1550036.
- (4) P. Caldiroli, A. Iacopetti, *Existence of stable  $H$ -surfaces in cones and their representation as radial graphs*, Calculus of Variations and PDE's (2016), 55: 131. doi:10.1007/s00526-016-1074-8.
- (5) A. Iacopetti, G. Vaira, *Sign-changing blowing-up solutions for the Brezis-Nirenberg problem in dimensions four and five*, Annali della Scuola Normale Superiore di Pisa, Vol. XVIII, Issue 1, 1–38 (2018), doi: 10.2422/2036-2145.201602\_003.
- (6) P. Caldiroli, A. Iacopetti, *Existence of isovolumetric  $S^2$ -type stationary surfaces for capillarity functionals*, Revista Matemática Iberoamericana 34, no. 4, 1685–1709 (2018).
- (7) G. Cora, A. Iacopetti, *On the structure of the nodal set and asymptotics of least energy sign-changing radial solutions of the fractional Brezis-Nirenberg problem*, Nonlinear Analysis 176, 226–271 (2018).
- (8) D. Bonheure, A. Iacopetti, *On the regularity of the minimizer of the electrostatic Born-Infeld energy*, Arch. Ration. Mech. Anal. 232, 697–725 (2019).
- (9) D. Bonheure, A. Iacopetti, *Spacelike radial graphs of prescribed mean curvature in the Lorentz-Minkowski space*, Analysis & PDE, Vol. 12, No. 7, 1805–1842 (2019).
- (10) G. Cora, A. Iacopetti, *Sign-changing bubble-tower solutions to fractional semilinear elliptic problems*, Discrete and Continuous Dynamical Systems-A, Vol. 39, No. 10, 6149–6173 (2019).
- (11) G. Galise, A. Iacopetti, F. Leoni, F. Pacella, *New concentration phenomena for a class of radial fully nonlinear equations*, Annales de l'Institut Henri Poincaré C, Analyse non linéaire (in stampa), DOI: 10.1016/j.anihpc.2020.03.003
- (12) G. Galise, A. Iacopetti, F. Leoni, *Liouville-type results in exterior domains for radial solutions of fully nonlinear equations*, Journal of Differential Equations (in stampa), DOI: 10.1016/j.jde.2020.03.051

### Tesi di Dottorato:

- (1) A. Iacopetti, *Sign-changing solutions of the Brezis-Nirenberg problem: asymptotics and existence results*, Tesi di Dottorato (2015).

## Elenco Pubblicazioni

1. A. DELATORRE, G. MANCINI, *Improved Adams-type inequalities and their extremals in dimension  $2m$* , accepted for publication in Communications in Contemporary Mathematics (2020) ISSN: 0219-1997.

Nota: Accettato per la pubblicazione il 15.04.2020. Una copia della lettera di accettazione è inclusa nel file .zip che contiene le pubblicazioni.

2. G. MANCINI, L. MARTINAZZI, *Extremals for fractional Moser-Trudinger inequalities in dimension 1 via harmonic extensions and commutator estimates*, Advanced Nonlinear Studies (2020), ISSN: 1536-1365, <https://doi.org/10.1515/ans-2020-2089>
3. M. GROSSI, G. MANCINI, D. NAIMEN, A. PISTOIA, *Bubbling nodal solutions for a large perturbation of the Moser-Trudinger equation on planar domains*, Mathematische Annalen (2020), ISSN: 0025-5831, <https://doi.org/10.1007/s00208-020-01975-w>
4. G. MANCINI, G. ROMANI, *Uniform bounds for higher-order semilinear problems in conformal dimension*, Nonlinear Analysis 192 (2020), Art. n. 111717, ISSN: 0362-546X, <https://doi.org/10.1016/j.na.2019.111717>.
5. A. HYDER, G. MANCINI, L. MARTINAZZI, *Local and nonlocal singular Liouville equations in Euclidean spaces*, International Mathematics Research Notices (2019), ISSN: 1073-7928, <https://doi.org/10.1093/imrn/rnz149>.
6. G. MANCINI, P.-D. THIZY, *Glueing a peak to a non-zero limiting profile for a critical Moser-Trudinger equation*, J. Math. Anal. Appl., Volume 472 (2019), Issue 2, pg 1430-1457, ISSN: 0022-247X, url: <https://doi.org/10.1016/j.jmaa.2018.11.084>.
7. G. MANCINI, P.-D. THIZY, *Non-Existence of Extremals for the Adimurthi-Druet Inequality*, Journal of Differential Equations 266 (2019), Issues 2-3, pg 1051–1072, ISSN: 0022-0396, url: <http://doi.org/10.1016/j.jde.2018.07.065>.
8. G. MANCINI, L. MARTINAZZI, *The Moser-Trudinger inequality and its extremals on a disk via energy estimates*, Calculus of Variations and Partial Differential Equations 56 (2017), Art. 94, ISSN: 0944-2669, url: <http://doi.org/10.1007/s00526-017-1184-y>.
9. S. IULA, G. MANCINI, *Extremal Functions for Singular Moser-Trudinger Embeddings*, Nonlinear Analysis 156 (2017), pg 215-248, ISSN: 0362-546X, url: <http://doi.org/10.1016/j.na.2017.02.029>.
10. G. MANCINI, *Onofri-type inequalities for singular Liouville equations*, Journal of Geometric Analysis 26 (2016), Issue 2, pg 1202–1230, ISSN: 1050-6926, url: <http://doi.org/10.1007/s12220-015-9589-3>.
11. L. BATTAGLIA, G. MANCINI, *A note on compactness properties of the singular Toda system*, Atti Accad. Naz. Lincei, Rendiconti Lincei - Matematica e Applicazioni 26 (2015), no. 3, pg 299–307, ISSN: 1120-6330, url: <http://doi.org/10.4171/RLM/708>.

12. L. BATTAGLIA, G. MANCINI, *Remarks on the Moser-Trudinger inequality*, Advances in Nonlinear Analysis 2 (2013), no. 4, pg 389–425, ISSN: 2191-9496, url: <http://doi.org/10.1515/anona-2013-0014>.

## Tesi di Dottorato

- G. MANCINI, Sharp Inequalities and Blow-up Analysis for Singular Moser-Trudinger Embeddings, *SISSA PhD Thesis*, available at the webpage <https://www.math.sissa.it/users/gabriele-mancini>.

Roma, 15 luglio 2020

Gabriele Mancini

## ELENCO PUBBLICAZIONI E TESI DOTTORATO PRESENTATE

- Massetti, J. E. “A normal form à la Moser for diffeomorphisms and a generalization of Rüssmann’s translated curve theorem to higher dimensions”, *Analysis & PDE* 11-1 (2018), 149–170
- Massetti, J.E. “Normal forms for perturbations of systems possessing a Diophantine invariant torus”, *Ergodic Theory and Dynamical Systems*, 1-47. doi:10.1017/etds.2017.116 (2017, first published online)
- Biasco, L., Massetti, J.E. and Procesi, M. “Exponential and sub-exponential stability times for the NLS on the circle”, *Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl.* (2018)
- Biasco, L., Massetti, J.E. and Procesi, M. “ An Abstract Birkhoff Normal Form Theorem and Exponential Type Stability of the 1d NLS.” *Commun. Math. Phys.* 375, 2089–2153 (2020)
- Biasco, L., Massetti, J.E. and Procesi, M. “Almost periodic invariant tori for the NLS on the circle”, accepted for publication on *Annales de l’Institut Henri Poincaré, Analyse Nonlinéaire* (2019, ArXiv <https://arxiv.org/abs/1903.07576>)
- Massetti, J.E. “Quasi-périodicité et Quasi-conservativité”, tesi di Dottorato, Observatoire de Paris (2015)

# Lista pubblicazioni presentate da Filippo Morabito

1. *Index and nullity of the Gauss map of the Costa-Hoffman-Meeks surfaces*, **Indiana University Mathematics Journal**, Vol. 58, 2, 2009, 677-707.
2. *A Costa-Hoffman-Meeks type surface in  $H^2 \times R$* , **Transactions of the American Mathematical Society**, Vol. 363, No. 1, 2011, 1-36.
3. *Non-periodic Riemann examples with handles*, (with M. Traizet), **Advances in Mathematics**, 229, 2012, 26-53.
4. *Higher genus capillary surfaces in the unit ball of  $R^3$* , **Boundary Value Problems**, 130, 2014.
5. *Radial and non-radial solutions to an elliptic problem on annular domains in Riemannian manifolds with radial symmetry*, **Journal of Differential Equations**, 258, 1461-1493, 2015.
6. *Singly periodic free boundary minimal surfaces in a solid cylinder of  $R^3$* , **Discrete Continuous Dynamical Systems, Series A**, 35, n. 10, 4987-5001, 2015.
7. *Delaunay type domains for an overdetermined elliptic problem in  $S^n \times R$  and  $H^n \times R$* , (with P. Sicbaldi), **ESAIM Control, Optimisation and Calculus of Variations**, 22, n. 1, 1-28, 2016.
8. *Free boundary surfaces and saddle tower minimal surfaces in  $S^2 \times R$* , **Journal of Mathematical Analysis and Applications**, 443, 478-525, 2016.
9. *Asymptotically radial solutions to an elliptic problem on expanding annular domains in Riemannian manifolds with radial symmetry*, **Boundary Value Problems**, 124, 2016.
10. *Towering phenomena for the Yamabe equation on symmetric manifolds*, (with A. Pistoia, G. Vaira), **Potential Analysis**, 47, n. 1, 53-102, 2017.
11. *Singly periodic free boundary minimal surfaces in a solid cylinder of  $H^2 \times R$* , **Nonlinear Analysis**, 171, 208-237, 2018.
12. *Periodic minimal surfaces embedded in  $R^3$  derived from the singly periodic Scherk minimal surface*, **Communications in Contemporary Mathematics**, 22, 1, 2020, 1850075.

## Tesi di dottorato

Minimal surfaces derived from the Costa-Hoffman-Meeks examples

10 luglio 2020

## Lista completa delle pubblicazioni di Vincenzo Morinelli

### A) Pubblicazioni scientifiche:

1. R. Longo, V. Morinelli, K.-H. Rehren,  
*Where Infinite Spin Particles Are Localizable*,  
Commun. in Math. Phys., Volume 345, Issue 2, pp 587–614 (2016).  
<https://doi.org/10.1007/s00220-015-2475-9>.
2. V. Morinelli,  
*An algebraic condition for the Bisognano-Wichmann Property*,  
Proceedings of the 14th Marcel Grossmann Meeting - MG14, Rome pp. 3849-3854 (2017)  
[https://doi.org/10.1142/9789813226609\\_0509](https://doi.org/10.1142/9789813226609_0509).
3. V. Morinelli, Y. Tanimoto, M. Weiner,  
*Conformal covariance and the split property*  
Comm. Math. Phys. Volume 357, Issue 1, pp 379–406 (2018).  
<https://doi.org/10.1007/s00220-017-2961-3>.
4. V. Morinelli,  
*The Bisognano-Wichmann property on nets of standard subspaces, some sufficient conditions*,  
Ann. Henri Poincaré, Volume 19, Issue 3, 937–958 (2018).  
<https://doi.org/10.1007/s00023-017-0636-4>.
5. V. Morinelli, Y. Tanimoto,  
*Scale and Möbius covariance in two-dimensional Haag-Kastler net*,  
Commun. in Math. Phys. Vol 371, Issue 2, pp 619–650 (2019)  
<https://doi.org/10.1007/s00220-019-03410-x>
6. R. Longo, V. Morinelli, F. Preta, K.-H. Rehren,  
*Split property for free finite helicity fields*,  
Ann. Henri Poincaré, Volume 20, Issue 8, pp 2555-2258 (2019).  
<https://doi.org/10.1007/s00023-019-00820-4>
7. W. Dybalski, V. Morinelli,  
*Bisognano-Wichmann property for asymptotically complete massless QFT*,  
<https://doi.org/10.1007/s00220-020-03755-8>,  
Commun. in Math. Phys. (2020) - *In press*
8. V. Morinelli, K.-H. Rehren,  
*Spacelike deformations: Higher-helicity fields from scalar fields*  
<https://doi.org/10.1007/s11005-020-01294-w>  
Lett. in Math. Phys. (2020) - *In press*



**B) Ph.D. Thesis:**

1. V.Morinelli

“On the Bisognano-Wichmann Property, Nuclearity and Particle Localization”,

Advisor: Prof. Roberto Longo, Dicembre 2015, Univ. Roma Tor Vergata.

**C) Pubblicazioni sottomesse a riviste scientifiche sotto processo di peer review:**

1. A. Stottmeister\*, V. Morinelli, G. Morsella, Y. Tanimoto,

*Operator-algebraic renormalization and wavelets*

<https://arxiv.org/abs/arXiv:2002.01442> (2020)

\* = Corresponding author

Rome, 13/07/2020

Vincenzo Morinelli

# List of Publications, Paolo Piovano

<http://www.mat.univie.ac.at/~piovano/>

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## SUBMITTED TO PEER-REVIEWED JOURNAL

- [18] Sh. Kholmatov, P. Piovano  
Existence of minimizers for the SDRI model.  
*Submitted* (2020).  
<https://arxiv.org/abs/2006.06096>
  
- [17] E. Davoli, M. Kružík, P. Piovano, U. Stefanelli,  
Magnetoelastic thin films at large strains.  
*Submitted* (2020).  
<http://arxiv.org/abs/2003.05178>
  
- [16] L. Kreutz, P. Piovano,  
Microscopic validation of a variational model of epitaxially strained crystalline films.  
*Submitted* (2019).  
<https://arxiv.org/abs/1902.06561>

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## PEER-REVIEWED JOURNAL PUBLICATIONS

- [15]\* Sh. Kholmatov, P. Piovano,  
A unified model for stress-driven rearrangement instabilities.  
*Arch. Ration. Mech. Anal.*, **238** (2020), 415–488.  
<http://arxiv.org/abs/1902.06535>  
<https://doi.org/10.1007/s00205-020-01546-y>
  
- [14]\* E. Davoli, P. Piovano,  
Derivation of a heteroepitaxial thin-film model.  
*Interface Free Bound.*, **22-1** (2020), 1–26.  
<https://doi.org/10.4171/IFB/435>
  
- [13] M. Friedrich, E. Mainini, and P. Piovano,  
Atomistic potentials and the Cauchy-Born rule for carbon nanotubes: a review  
*Rendiconti Semin. Mat. Univ. Pol. Torino*, **77-2** (2020), 79–98.  
<https://arxiv.org/abs/1909.12023>

- [12]\* E. Davoli, P. Piovano,  
Analytical validation of the Young-Dupré law for epitaxially-strained thin films.  
*Math. Models Methods Appl. Sci.*, **29-12** (2019), 2183–2223.  
<https://doi.org/10.1142/S0218202519500441>
  
- [11]\* E. Mainini, P. Piovano, B. Schmidt, U. Stefanelli,  
 $N^{3/4}$  law in the cubic lattice.  
*J. Stat. Phys.*, **176-6** (2019), 1480–1499.  
<https://doi.org/10.1007/s10955-019-02350-z>
  
- [10]\* M. Friedrich, E. Mainini, P. Piovano, U. Stefanelli,  
Characterization of optimal carbon nanotubes under stretching and validation  
of the Cauchy-Born rule.  
*Arch. Ration. Mech. Anal.*, **231-1** (2019), 465–517.  
<https://doi.org/10.1007/s00205-018-1284-7>
  
- [9]\* E. Mainini, H. Murakawa, P. Piovano, U. Stefanelli,  
Carbon-Nanotube Geometries as Optimal Configurations.  
*Multiscale Model. Simul.*, **15-4** (2017), 1448–1471.  
<https://doi.org/10.1137/16M1087862>.
  
- [8]\* E. Davoli, P. Piovano, and U. Stefanelli,  
Sharp  $N^{3/4}$  Law for the Minimizers of the Edge-Isoperimetric Problem on the  
Triangular Lattice  
*J. Nonlinear Sci.*, **27-2** (2017), 627–660.  
<https://doi.org/10.1007/s00332-016-9346-1>
  
- [7]\* E. Mainini, H. Murakawa, P. Piovano, U. Stefanelli,  
Carbon-Nanotube Geometries: Analytical and Numerical Results.  
*Discret. Contin. Dyn. Syst. Ser. B*, **10-1** (2017), 141–160.  
<https://doi.org/10.3934/dcdss.2017008>

- [6]\* M. Friedrich, P. Piovano, U. Stefanelli,  
The Geometry of  $C_{60}$ : A rigorous Approach via Molecular Mechanics.  
*SIAM J. Appl. Math.*, **76-5** (2016), 2009–2029.  
<https://doi.org/10.1137/16M106978X>
  
- [5]\* E. Davoli, P. Piovano, U. Stefanelli,  
Wulff Shape Emergence in Graphene.  
*Math. Models Methods Appl. Sci.*, **26-12** (2016), 2277–2310.  
<https://doi.org/10.1142/S0218202516500536>
  
- [4] E. Mainini, P. Piovano, U. Stefanelli,  
Crystalline and Isoperimetric Square Configurations.  
*Proc. Appl. Math. Mech.* **14**, (2014) 1045–1048.
  
- [3]\* E. Mainini, P. Piovano, U. Stefanelli,  
Finite Crystallization in the Square Lattice.  
*Nonlinearity*, **27** (2014), 4:717–737.  
<https://doi.org/10.1088/0951-7715/27/4/717>
  
- [2]\* P. Piovano,  
Evolution of Elastic Thin Films with Curvature Regularization via Minimizing Movements.  
*Calc. Var. Partial Differential Equations*, **49** (2014), 337–367.  
<https://doi.org/10.1007/s00526-012-0585-1>

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## MONOGRAPHS

- [1] P. Piovano,  
Evolution and Regularity Results for Epitaxially Strained Thin Films and Material Voids.  
*ProQuest; Thesis (Ph.D.)—Carnegie Mellon University* 2012, Vol. **74-01(E)**, Sect. B., p. 108.  
ISBN: 9781267655349

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## NON PEER-REVIEWED PUBLICATIONS

- L. Kreutz, P. Piovano,  
Microscopic validation of a variational model of epitaxially strained crystalline films.  
*Oberwolfach Rep.* **49** (2019), 35–37.  
[https://www.mfo.de/occasion/1844/www\\_viewpdf](https://www.mfo.de/occasion/1844/www_viewpdf)

Pubblicazioni indicate con asterisco (\*) nel precedente elenco sono allegate (oltre alla tesi di dottorato).

## ELENCO PUBBLICAZIONI PRESENTATE

EMANUELA RADICI

- Tesi – *Diffeomorphic approximation of planar elastic deformations* , PhD Thesis, supervisor prof. A. Pratelli.
- Pubblicazioni – D. Campbell, S. Hencl, A. Kauranen, E. Radici: *Strict limits of BV planar homeomorphisms*, 2018, *Nonlinear Analysis* 177, 209-237.
- D. Campbell, A. Pratelli, E. Radici: *Comparison between the non-crossing and the non-crossing on lines properties*, 2020, preprint
- C. Dappiaggi, F. Finster, S. Murro, E. Radici: *The Fermionic signature operator in De Sitter spacetime*, 2020, *J. Math. Anal. and Appl.* 485-2, 123808
- M. Di Francesco, S. Fagioli, E. Radici: *Deterministic particle approximation for nonlocal transport equations with nonlinear mobility*, 2019, *J. Differential Equations* 266, 2830-2868.
- S. Fagioli, E. Radici: *Solutions to aggregation-diffusion equations with nonlinear mobility constructed via a deterministic particle approximation*, 2018, *Math. Mod. and Meth. in App. Sci.* 28, 1801-1829.
- S. Fagioli, E. Radici: *Opinion formation systems via deterministic particle approximation*, 2020, preprint.
- A. Pratelli, E. Radici: *On the piecewise approximation of bi-Lipschitz curves*, 2017, *Rend. Sem. Mat. Univ. Padova* 138, 1-37.
- A. Pratelli, E. Radici: *On the planar minimal BV extension problem*, 2018, *Rendiconti Lincei: Matematica e Applicazioni* 29-3, 511-555.
- A. Pratelli, E. Radici: *Approximation of BV planar homeomorphisms by diffeomorphisms*, 2019, *Journal of Functional Analysis* 276, 659-686.
- E. Radici: *A planar  $W^{1,p}$  Sobolev extension theorem for piecewise linear homeomorphisms*, 2016, *Pacific Journal of Mathematics* 283-2, 405-418.

**PROCEDURA PUBBLICA DI SELEZIONE PER L'ASSUNZIONE DI N.1 RICERCATORE A TEMPO DETERMINATO AI SENSI DELL'ART.24, COMMA 3, LETT. B) DELLA LEGGE 240/2010 PER IL SETTORE CONCURSALE 01/A3 - SETTORE SCIENTIFICO DISCIPLINARE MAT/05 - Analisi Matematica- DIPARTIMENTO DI MATEMATICA E FISICA - UNIVERSITA' ROMA TRE .**

## **VERBALE N. 2**

### **ALLEGATO B**

***(curricula dei candidati)***

# Curriculum Vitae Europass



## Informazioni personali

Cognome/Nome

Baldi, Mauro Maria

Email

Maschile

## Esperienze lavorative

Posizione attuale

Assegnista di ricerca presso il Dipartimento di Informatica dell'Università degli Studi di Milano-Bicocca per il progetto SideraB, titolare delle esercitazioni del corso di ricerca operativa e pianificazione delle risorse, tutor del corso di decision models e tutor per studenti con difficoltà di apprendimento nelle materie di analisi matematica I e II e ricerca operativa. L'attività di ricerca attuale tratta tematiche di machine learning e data analytics per il monitoraggio della salute dei pazienti coinvolti nel suddetto progetto. Parallelamente al progetto Siderab, si stanno seguendo altri due filoni di ricerca: la sentiment analysis applicata ai social network al fine di predire il comportamento degli utenti ivi iscritti, nonché l'applicazione di algoritmi di machine learning per la predizione delle manovre di sorpasso durante la guida, con lo scopo di incrementare la sicurezza in ambito automobilistico.

Al momento sono anche supervisore dei tesisti Nicola Cilli, Gabriele Madotto ed Edoardo Colaiana per la laurea in Ingegneria Informatica presso l'Università degli Studi di Milano-Bicocca.

Infine sto facendo ricerca su dei modelli di diffusione epidemiologica.

Da settembre 2018 a novembre 2018

Docente di matematica e scienze presso l'istituto CNOS-FAP di Vigliano Biellese (BI)

Da marzo 2018 a settembre 2018

Attività di ricerca presso il Dipartimento di Automatica ed Informatica del Politecnico di Torino nell'ambito della ricerca operativa applicata a problemi di ottimizzazione nella logistica e nei trasporti.

Da febbraio 2017 a marzo 2017

Attività di ricerca presso il Dipartimento di Automatica ed Informatica del Politecnico di Torino nell'ambito del machine learning.

Da gennaio 2013 a dicembre 2016

Ricercatore postdoc presso il Dipartimento di Automatica ed Informatica del Politecnico di Torino. I temi trattati sono stati: implementazione di modelli di machine learning in campo automobilistico, sviluppo di algoritmi di ottimizzazione nel campo della ricerca operativa, in modo particolare con applicazioni nel packing, nella logistica e nei trasporti. Tali algoritmi sono stati studiati anche dal punto di vista della teoria dell'approssimazione. Inoltre sono stati sviluppati algoritmi di schedulazione e di ottimizzazione nel campo della manutenzione ferroviaria e dei trasporti.

Da gennaio 2010 a dicembre 2012

Dottorato di ricerca in ingegneria informatica (con specializzazione in ricerca operativa) presso la speciale Scuola Interpolitecnica di Dottorato, con sede al Politecnico di Torino e sotto la supervisione dei professori R. Tadei e G. Perboli. La Scuola Interpolitecnica di Dottorato si affiancava ai corsi di dottorato ordinari allo scopo di proporre un dottorato di ricerca di alta qualificazione. Durante tale periodo sono stati studiati algoritmi di ottimizzazione, sia deterministici che stocastici, per i trasporti e la logistica.

Da marzo 2009 a dicembre 2009

Assegno di ricerca presso il Dipartimento di Automatica ed Informatica del Politecnico di Torino per il progetto diaRail riguardante la gestione di un centro di diagnostica ferroviaria in Piemonte. Parallelamente furono effettuati studi preliminari di ricerca operativa sul Generalized Bin Packing Problem, con applicazioni nel campo dei trasporti e della logistica.



## Titoli di studio

Dottorato di ricerca di alta qualificazione della Scuola Interpolitecnica di Dottorato in ingegneria informatica con specializzazione in ricerca operativa, conseguito presso il Politecnico di Torino il 28 febbraio 2013.

Laurea specialistica in ingegneria elettronica, conseguita presso il Politecnico di Torino il 9 dicembre 2008, con votazione 110 e lode.

Laurea in ingegneria elettronica, conseguita presso il Politecnico di Torino il 9 gennaio 2006, con votazione 108/110.

## Progetti di ricerca

Da ottobre 2019 ad oggi	Partecipazione al progetto SideraB con implementazione di modelli di data analytics per l'analisi di dati comportamentali dei pazienti coinvolti nel progetto.
Da dicembre 2018 a settembre 2019	Partecipazione al progetto SMARTCAL con implementazione di algoritmi di machine learning per la classificazione delle recensioni degli utenti su social network in campo turistico.
Da gennaio 2016 a marzo 2017	Partecipazione al progetto europeo Synchro-NET per lo sviluppo di una piattaforma intelligente al fine di promuovere il trasporto intermodale e sostenibile delle merci.
Da gennaio 2014 a dicembre 2015	Partecipazione al progetto europeo Deserve caratterizzato dall'implementazione di algoritmi di machine learning per la predizione dei sorpassi. La gestione del dataset avvenne in collaborazione con il Centro Ricerche Fiat di Orbassano (TO).
Da gennaio 2014 a settembre 2016	Partecipazione al progetto Urbelog. Il progetto si proponeva di sviluppare un'innovativa piattaforma telematica per la logistica dell'ultimo miglio in ambito urbano.
Da giugno 2013 a dicembre 2013	Partecipazione al progetto PIE VERDE in merito allo sviluppo di una piattaforma tecnologica per i veicoli ibridi.
Da giugno 2011 a novembre 2013	Partecipazione al progetto europeo AcemRail, riguardante l'ottimizzazione delle operazioni di manutenzione ferroviaria. Sono stati sviluppati algoritmi per la schedulazione delle attività di manutenzione.
Da marzo 2009 ad agosto 2013	Partecipazione al progetto europeo euroFOT, riguardante lo sviluppo di tecnologie intelligenti al fine di migliorare la sicurezza a bordo dei veicoli.
Da marzo 2009 a dicembre 2009	Partecipazione al progetto regionale diaRail inerente la realizzazione di un centro di diagnostica ferroviaria in Piemonte.

## Attività all'estero

Da aprile 2012 a settembre 2012	Attività di ricerca conclusiva durante la Scuola Interpolitecnica di Dottorato presso il centro di ricerca CIRRELT a Montreal, Canada, sotto la supervisione del Professor T. G. Crainic.
Maggio 2010	Breve periodo di ricerca durante il dottorato presso il centro di ricerca CIRRELT a Montreal, Canada sotto la supervisione dei Professori T. G. Crainic e W. Rei.

## Attività didattica

Posizione attuale	Tutor del corso di decision models e tutor per studenti con difficoltà di apprendimento nelle materie di ricerca operativa ed analisi matematica I e II per l'Università degli Studi di Milano-Bicocca.
Da settembre 2019 a gennaio 2020	Attività di esercitatore per il corso "Ricerca Operativa e Pianificazione delle Risorse", presso l'Università degli Studi di Milano-Bicocca, nonché tutoraggio per studenti affetti da DSA nelle materie di ricerca operativa e di analisi matematica.
Dal 2015 al 2018	Attività di esercitatore, sia in aula che in laboratorio, per il corso "Ottimizzazione per il Problem Solving", presso il Politecnico di Torino.
Dal 2011 al 2013	Attività di esercitatore per il corso "Programmazione Matematica", presso il Politecnico di Torino.

## Attività editoriale

Attività di revisore per la rivista *Omega*, Elsevier.

Attività di revisore per la rivista *Journal of Heuristics*, Springer.

Attività di revisore per la rivista *European Journal of Operational Research*, Elsevier.

## Competenze linguistiche e personali

Madrelingua  
*Autovalutazione*  
*Livello europeo<sup>(\*)</sup>*

**Inglese**

**Spagnolo**

Certificazioni

Competenze informatiche

## Premi

## Scuole ed eventi formativi

## Pubblicazioni

Articoli

### Italiana

Comprensione		Parlato		Scritto	
Ascolto	Lettura	Interazione	Produzione orale		
B1 Livello intermedio	B1 Livello intermedio	B1 Livello intermedio	B1 Livello intermedio	B1 Livello intermedio	
A2 Livello elementare	A2 Livello elementare	A2 Livello elementare	A2 Livello elementare	A2 Livello elementare	

Preliminary English Test con votazione “pass with merit”, conseguito nel marzo 2004.

Buona conoscenza delle seguenti materie: scienza dei dati, data analytics, machine learning, ottimizzazione e ricerca operativa. Buona conoscenza dei seguenti linguaggi di programmazione: Python, Matlab, C++, C, Java e Pascal. Buona conoscenza dei solver Cplex, Xpress, Gurobi, del Pattern Recognition Toolbox di Matlab e dell'ambiente NetKit. Buona conoscenza degli ambienti Latex e Tikz, e di Microsoft Office. Buona conoscenza dei linguaggi Html, Css, Javascript ed SQL. Conoscenza elementare del linguaggio Assembler e dei pacchetti plotly e dash di Python per la creazione di dashboard.

Vincitore del “Concorso di idee” presso il Politecnico di Torino ([https://didattica.polito.it/pls/portal30/sviluppo.bacheca.open\\_pdf?p\\_id=2719&q=.pdf](https://didattica.polito.it/pls/portal30/sviluppo.bacheca.open_pdf?p_id=2719&q=.pdf)) in data 8 marzo 2013.

*Stochastic Programming Course*. Milano, Italy, February, 6–March, 5, 2012. Università degli Studi di Milano–Bicocca

*Winter School on Optimization in Logistics and Transportation*. Estoril, Portugal, January 16–20, 2012. CIRRELT

*European Logistics Association Doctorate Workshop*. Schindellegi, June, 29–July, 2, 2011

*Scuola estiva di Ricerca Operativa CIRO–AIRO*, June 26–July 3, 2010. CIRO–AIRO

*Spring School on Combinatorial Optimization in Logistics*. Montreal, Canada, May 17–20, 2010. Université de Montreal

*Spring School on Supply Chain and Transportation Network Design*. Montreal, Canada, May 12–14, 2010. CIRRELT

G. Kaniadakis, M.M. Baldi, Th.S. Deisboeck, G. Grisolia, S.M. Scarfone, A. Sparavigna, and U. Lucia. The  $\kappa$ -statistics approach to epidemiology. *Submitted*, 2020

M. M. Baldi, E. Fersini, and E. Messina. Relational bayesian model averaging for sentiment analysis in social networks. In G. Nicosia, P. Pardalos, G. Giuffrida, R. Umerton, and V. Sciacca, editors, *The 6th International Conference on machine Learning, Optimization and Data science - LOD 2020*, Lecture Notes in Computer Science. Springer. Accepted for publication

M. M. Baldi, D. Manerba, G. Perboli, and R. Tadei. A generalized bin packing problem for parcel delivery in last-mile logistics. *European Journal of Operational Research*, 274:990–999, 2019

M. M. Baldi and M. Bruglieri. On the generalized bin packing problem. *ITOR*, 24:425–438, 2017. DOI 10.1111/itor.12258

M. M. Baldi, G. Perboli, and R. Tadei. Driver maneuvers inference through machine learning. In *Machine Learning, Optimization, and Big Data*, pages 182–192. Springer International Publishing, 2016

A. C. Sparavigna and M. M. Baldi. Symmetry and the golden ratio in the analysis of a regular pentagon. *International Journal of Mathematical Education in Science and Technology*, pages 1–11, 2016. DOI: 10.1080/0020739X.2016.1233587

M. M. Baldi, F. Heinicke, A. Simroth, and R. Tadei. New heuristics for the stochastic tactical railway maintenance problem. *Omega*, 63(C):94–102, 2016. DOI <http://dx.doi.org/10.1016/j.omega.2015.10.005>

M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. Branch-and-price and beam search algorithms for the variable cost and size bin packing problem with optional items. *AnnalsOR*, 222(1):125–141, 2014. DOI 10.1007/s10479-012-1283-2

M. M. Baldi. Generalized bin packing problems. *4OR*, 12(3):293–294, 2014. DOI 10.1007/s10288-013-0252-1

M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. Asymptotic results for the generalized bin packing problem. *Procedia - Social and Behavioral Sciences*, 111:663–671, 2013. DOI 10.1016/j.sbspro.2014.01.100

M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. The generalized bin packing problem. *Transportation Research Part E*, 48(6):1205–1220, 2012

M. M. Baldi, M. Ghirardi, G. Perboli, and R. Tadei. The capacitated transshipment location problem under uncertainty: A computational study. *PROCEDIA*, 39:424–436, 2012

R. Tadei, G. Perboli, and M. M. Baldi. The capacitated transshipment location problem with stochastic handling costs at the facilities. *ITOR*, 19(6):789–807, 2012

M. M. Baldi, G. Perboli, and R. Tadei. The three-dimensional knapsack problem with balancing constraints. *Applied Mathematics and Computation*, 218(19):9802–9818, 2012

G. Perboli, R. Tadei, and M. M. Baldi. The stochastic generalized bin packing problem. *DAMath*, 160:1291–1297, 2012

Proceedings

C. Calefato, M. Kutila, C. Ferrarini, E. Landini, M. M. Baldi, and R. Tadei. Development of cost efficient adas tool platform for automotive industry. In *The 22nd ITS World Congress in Bordeaux (France), October 5–9, 2015*, 2015

F. Heinicke, A. Simroth, R. Tadei, and M. M. Baldi. Job order assignment at optimal costs in railway maintenance. In *Proceedings of the 1st International Conference on Operations Research and Enterprise Systems (ICORES 2013), Barcelona, Spain, 16-18 February, 2013*. SciTePress, 2013

Conferenze con peer-review

M. M. Baldi, G. Perboli, and R. Tadei. Driver maneuvers inference through machine learning. In *MOD 2016 - The Second International Workshop on Machine Learning, Optimization and Big Data, Volterra (Italy), August 26–29, 2016*, 2016

M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. Asymptotic results for the generalized bin packing problem. In *16th Euro Working Group on Transportation, Porto (Portugal), September 4–6, 2013*, 2013

T. G. Crainic, R. Tadei, G. Perboli, and M. M. Baldi. Rich packing problems arising in transportation and logistics. In *VeRoLog 2012, Bologna (Italy), June 18–20 2012*, 2012

	<p>T. G. Crainic, R. Tadei, G. Perboli, and M. M. Baldi. The generalized bin packing problem: Models and bounds. In <i>Odysseus 2012, the 5th International Workshop on Freight Transportation and Logistics, Mykonos (Greece), May 21–25, 2012</i>, 2012</p> <p>M. M. Baldi, G. Perboli, and R. Tadei. The three-dimensional knapsack problem with balancing constraints. In <i>ORP<sup>3</sup> Cádiz Conference, Cádiz (Spain), September 13–17, 2011</i>, 2011</p> <p>M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. The generalized bin packing problem: Models and algorithms design. In <i>ELA Doctorate workshop, Schindellegi (Switzerland), June 29–July 1, 2011</i>, 2011</p> <p>M. M. Baldi, M. Ghirardi, G. Perboli, and R. Tadei. The capacitated transshipment location problem under uncertainty: a computational study. In <i>The Seventh International Conference on City Logistics, Mallorca (Spain), June 7–9, 2011</i>, 2011</p> <p>R. Tadei, N. Ricciardi, G. Perboli, and M. M. Baldi. An efficient heuristic for the transshipment location problem under uncertainty with lower and upper capacity constraints. In <i>5th International Conference on Operations Research CIRO'10, Marrakech (Morocco), May 24–27, 2010</i>, 2010</p>
Altre conferenze	<p>M. M. Baldi, L. Gobbato, G. Perboli, and R. Tadei. Recent advances of bin-packing problems in the field of transportation and logistics. In <i>AIRO 2016, Trieste (Italy), September 6–9, 2016</i>, 2016</p> <p>M. M. Baldi, F. Heinicke, A. Simroth, and R. Tadei. The generalized bin packing problem: a link between logistics and maintenance optimization. In <i>AIRO 2015, Pisa (Italy), September 7–10, 2015</i></p> <p>M. M. Baldi, L. Gobbato, G. Perboli, and R. Tadei. The generalized bin packing problem with bin-dependent item profits: a case study. In <i>AIRO2014, Como (Italy), September 2–5, 2014</i>, 2014</p> <p>G. Perboli, R. Tadei, L. Gobbato, and M. M. Baldi. The stochastic generalized bin packing problem. In <i>XIII International Conference on Stochastic Programming, Bergamo (Italy), July 8–12, 2013</i>, 2013</p> <p>M. M. Baldi, R. Tadei, G. Perboli, and N. Ricciardi. The capacitated transshipment location problem with stochastic handling utilities at the facilities. In <i>Optimization Days 2012, Montreal (Canada), May 7–9, 2012</i>, 2012</p> <p>M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. The generalized bin packing problem: Models and bounds. In <i>AIRO 2011, Brescia (Italy), September 6–9, 2011</i>, 2011</p> <p>M. M. Baldi, M. Ghirardi, G. Perboli, and R. Tadei. The capacitated transshipment location problem under uncertainty: a computational study. In <i>The Seventh International Conference on City Logistics, Mallorca (Spain), June 7–9, 2011</i>, 2011</p> <p>R. Tadei, N. Ricciardi, G. Perboli, and M. M. Baldi. An efficient heuristic for the transshipment location problem under uncertainty with lower and upper capacity constraints. In <i>5th International Conference on Operations Research CIRO'10, Marrakech (Morocco), May 24–27, 2010</i>, 2010</p> <p>M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. The general bin packing problem. In <i>Optimization Days 2010, Montreal (Canada), May 10–12, 2010</i>, 2010</p>
Capitoli di libro	<p>A. C. Sparavigna and M. M. Baldi. Visible from above: How satellite imagery can help investigating the life of insects. In J. A. Daniels, editor, <i>Advances in Environmental Research</i>, pages 249–264. Nova Science Publishers, Hauppauge, NY, 2016. ISBN: 978-1-53610-469-1</p> <p>M.M. Baldi, G. Perboli, and R. Tadei. The three-dimensional knapsack problem with balancing constraints. In A. Castaño, I. Espejo, B. López, J. Puerto, C. Ramos, A. Rodriguez, and C. Valero, editors, <i>Proceedings of OR Peripatetic Post-Graduate Programme (ORP<sup>3</sup>-2011)</i>, pages 131–135. Servicio de Publicaciones de la Universidad de Cádiz, 2011. ISBN 978-84-9828-348-8</p>
Tesi di dottorato	<p>M. M. Baldi. <i>Generalized Bin Packing Problems</i>. PhD thesis, Politecnico di Torino, 2013</p>
Technical reports	<p>M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. Worst-case analysis for new online bin packing problems. Technical Report CIRRELT-2013–11, CIRRELT, 2013</p>

- M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. Branch-and-price and beam search algorithms for the generalized bin packing problem. Technical Report CIRRELT-2012-01, CIRRELT, 2012
- M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. The generalized bin packing problem. Technical report, CIRRELT, CIRRELT-2011-39, 2011
- R. Tadei, G. Perboli, N. Ricciardi, and M. M. Baldi. The transshipment location problem under uncertainty with lower and upper capacity constraints. Technical report, CIRRELT-2011-31, 2011
- M. M. Baldi, T. G. Crainic, G. Perboli, and R. Tadei. The generalized bin packing problem. Technical report, CIRRELT, CIRRELT -2010-21, 2010

Altro

- A. C. Sparavigna and M. M. Baldi. A study of the regular pentagon with a classic geometric approach, 2016. <https://hal.archives-ouvertes.fr/hal-01295771>
- A. C. Sparavigna and M. M. Baldi. Symmetry and golden ratio in the analysis of regular pentagon, 2016. <https://hal.archives-ouvertes.fr/hal-01283001/file/symmetry-and-analysis-pentagon.pdf>
- A. C. Sparavigna and M. M. Baldi. A mathematical study of a symbol: the vesica piscis of sacred geometry. *Philica*, (560), 2016. [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2748242](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2748242). Distributed in SSRN AESTHETICS & PHILOSOPHY OF ART eJOURNAL, Vol. 8, No. 6: Mar 22, 2016
- A. C. Sparavigna and M. M. Baldi. Japanese temple geometry: A digital sangaku about a regular pentagon and the golden ratio. *SSRN*, 2016. DOI: <http://dx.doi.org/10.2139/ssrn.2836615>
- A. C. Sparavigna and M. M. Baldi. Flower of life, six-fold symmetry and honeycomb packing of circles in the mycenaean geometry. Distributed in SSRN Logic & Philosophy of Mathematics eJournal, Vol 8, Issue 6, April 07, 2016; distributed in SSRN Cognition in Mathematics, Science, & Technology eJournal Vol 8, Issue 16, April 20, 2016. [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2756099](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2756099), DOI:10.2139/ssrn.2756099
- A. C. Sparavigna and M. M. Baldi. A minoan geometry for bisecting and trisecting the right angle, 2016. Social Science Research Network, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2754536](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2754536)
- A. C. Sparavigna and M. M. Baldi. Overlapping circles grid drawn with compass and straightedge on an egyptian artifact of 14th century bc. Distributed in SSRN Non-Western Philosophy eJournal Vol 8, Issue 3, March 21, 2016, 2016. <http://arxiv.org/abs/1603.08536>, DOI: 10.2139/ssrn.2750125
- A. C. Sparavigna and M. M. Baldi. Intermodalism in the transportation network of the roman empire. *SSRN*, 2016. DOI: 10.2139/ssrn.2803869

## Autorizzazione

Si autorizza il trattamento dei dati personali riportati ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali".

# Curriculum Vitae

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## Research Areas

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- |                       |                        |                         |
|-----------------------|------------------------|-------------------------|
| - Symplectic Geometry | - Hamiltonian Dynamics | - Calculus of Variation |
| - Floer Theory        |                        | - Magnetic Systems      |

## Academic Career

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- May 2018 – Sep 2024    **Juniorprofessor – Ruprecht-Karls-Universität Heidelberg**  
Leader of the *Symplectic Geometry* group together with Prof. Peter Albers.
- Aug 2018 – Dec 2018    **Postdoctoral Fellow – MSRI** (on leave from the University of Heidelberg)  
Research program *Hamiltonian Systems, from Topology to Applications through Analysis*.
- Jul 2016 – Apr 2018    **Academic Assistant – Universität Leipzig**  
Member of the *Differential Geometry* group. Leader: Prof. Hans-Bert Rademacher.
- Sep 2014 – May 2016    **Postdoctoral Fellow – Westfälische Wilhelms-Universität Münster**  
Member of the *Symplectic Geometry* group within the research program *SFB 878: Groups, Geometry & Actions*. Leaders: Prof. Peter Albers, Prof. Kai Zehmisch.

## Education

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- 24th Oct 2015    **PhD – University of Cambridge.**  
- *Thesis*: The contact property for magnetic flows on surfaces.  
- *Advisor*: Prof. Gabriel P. Paternain.  
- *Sponsored by*: External Research Scholarship, Trinity College, 2011 – 2014.
- 12th Jun 2012    **Diploma – Scuola Normale Superiore di Pisa. 70/70 cum laude.**  
- *Dissertation*: Exact magnetic flows on closed orientable surfaces.  
- *Sponsored by*: Student scholarship, 2006 – 2011.
- 30th Sep 2011    **Master in Mathematics – Università di Pisa. 110/110 cum laude.**  
- *Thesis*: An approach to the Weinstein conjecture via holomorphic curves.  
- *Advisor*: Prof. Alberto Abbondandolo.
- 24th Jul 2009    **Bachelor in Mathematics – Università di Pisa. 110/110 cum laude.**  
- *Thesis*: The Peter–Weyl theorem.  
- *Advisor*: Prof. Fulvio Ricci.

## Funding

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2021 – 2024	Application for a PhD position in the research proposal <i>SFB/TRR 191</i> (submitted).
2020	<i>Lump sum</i> of <i>SFB/TRR 191</i> : hiring of one postdoc (70 000 Euros).
2021	Host of Prof. Jungsoo Kang, <i>Humboldt Research Fellowship for Experienced Researchers</i> .
2020 – 2026	Associated member of <i>Excellence Cluster STRUCTURES</i> .
2018 – 2021	Associated member of <i>GRK 2229 Asymptotic Invariants and Limits of Groups and Spaces</i> .
2018 – 2020	Associated member of <i>SFB/TRR 191 Symplectic Structures in Geometry, Algebra and Dynamics</i> .

## Collaborators

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- Alberto Abbondandolo ( <i>Ruhr-Universität Bochum</i> )	- Alexander F. Ritter ( <i>University of Oxford</i> )
- Luca Asselle ( <i>Justus-Liebig-Universität Gießen</i> )	- Iskander A. Taimanov ( <i>Novosibirsk State University</i> )
- Jungsoo Kang ( <i>Seoul National University</i> )	- Kai Zehmisch ( <i>Ruhr-Universität Bochum</i> )
- Marco Mazzucchelli ( <i>ENS Lyon</i> )	

## Organization of Conferences and Seminars

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19th – 22th Jan 2020	School <i>The Implicit Function Theorem in Geometry and Dynamics</i> , University of Gießen.
Since Apr 2018	<i>BACH Symplectic and Contact Geometry Seminar</i> (Bochum-Aachen-Cologne-Heidelberg).
Since Apr 2018	Research seminar <i>Symplectic Geometry and Geometry</i> , University of Heidelberg.
9th – 13th Jul 2018	Conference <i>Symplectic Dynamics</i> , University of Heidelberg.

## Refereeing

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Reviewer for	MathSciNet Mathematical Reviews (11 entries).
Referee for	<ul style="list-style-type: none"><li>- Annals of Global Analysis and Geometry</li><li>- Bulletin of the London Mathematical Society</li><li>- Communications in Contemporary Mathematics</li><li>- Ergodic Theory and Dynamical Systems</li><li>- Journal of Differential Equations</li><li>- Journal of the European Mathematical Society</li><li>- Journal of Modern Dynamics</li><li>- Journal of Topology and Analysis</li><li>- Manuscripta Mathematica</li><li>- Nonlinearity</li><li>- Proceedings of the American Mathematical Society</li><li>- Transactions of the American Mathematical Society</li></ul>
Master thesis	Xinyi Xie, <i>Evolvente und Evolute einer Kurve im <math>\mathbb{E}^n</math></i> . Leipzig, 2017.
PhD Thesis	Amin Mohebbi, <i>The ECH capacities of the rotating Kepler problem</i> . Augsburg, 2020.

## Further Training

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2019	Management Program, <i>Auf dem Weg zur Professur</i> , University of Heidelberg.
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## Invited Talks

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- 2020
  - *Systolic inequalities: from Riemannian and convex geometry to symplectic geometry.*  
DD & GT Seminar, University of Utrecht, Amsterdam and Leiden.
  - *On the local systolic optimality of Zoll contact forms.*  
CAST Workshop 2020, University of Antwerp.
- 2019
  - *Periodic motions of a charged particle in a stationary magnetic field.*  
Oberseminar Geometrie und Analysis, University of Aachen.
  - *Zoll magnetic systems on surfaces.*  
Workshop on Conservative Dynamics and Symplectic Geometry, IMPA, Rio de Janeiro.
  - *A magnetic systolic inequality on surfaces.*  
Multiple perspectives on geometric inequalities, CRM, Barcelona.
  - *A local systolic inequality for odd-symplectic forms on circle bundles.*  
Symplectix Seminaire, IHP, Paris.
- 2018
  - *Systolic inequalities in contact and symplectic geometry.*  
Northern California Symplectic Geometry Seminar, Berkeley.
  - *Systolic inequalities in contact and symplectic geometry.*  
Symplectic Geometry Seminar, IAS - Princeton University.
  - *The magnetic systolic inequality.*  
40. Süddeutsches Kolloquium über Differentialgeometrie, Heidelberg.
  - *A local contact systolic inequality in dimension three and an application to magnetic flows.*  
Symplectic Geometry Seminar, ETH, Zurich.
  - *A local systolic inequality for odd-symplectic forms.*  
Workshop on Symplectic Dynamics, SNU, Seoul.
- 2017
  - *Systolic inequalities in contact and symplectic geometry.*  
Conference on Hamiltonian Systems (in memory of J. Mather), Monte Verità, Ascona.
  - *Systolic inequalities in contact and symplectic geometry.*  
GIF Workshop - Floer homology and contact topology, University of Haifa.
  - *Systolic inequalities in contact and symplectic geometry.*  
Workshop on Conservative Dynamics and Symplectic Geometry, IMPA, Rio de Janeiro.
  - *Systolic inequalities in contact and symplectic geometry.*  
Hamiltonian and Reeb Dynamics: New Methods & Applications, Lorentz Center, Leiden.
- 2016
  - *Systolic inequalities in contact and symplectic geometry.*  
Geometry and Topology Seminar, MIT, Cambridge.
  - *The Bangert waist theorem for magnetic flows.*  
Bochum-Dortmund joint Differential Geometry Seminar.
- 2015
  - *The Lusternik-Fet theorem for magnetic flows.*  
Non-linear Analysis Seminar, Gdańsk University of Technology.
- 2014
  - *Contact property and symplectic cohomology of non-exact magnetic flows on the two-sphere.*  
Symplectic Geometry Seminar, WWU Münster.
  - *Contact property and symplectic cohomology of non-exact magnetic flows on the two-sphere.*  
Differential Geometry Seminar, University of Cambridge.
  - *Contact property and symplectic cohomology of non-exact magnetic flows on the two-sphere.*  
Seminario di Analisi e Sistemi Dinamici, Università degli Studi Roma 3.
- 2013
  - *Contact property of symplectic magnetic flows on the two-sphere.*  
Algebraic and Symplectic Geometry Seminar, University of Oxford.
  - *Contact property of symplectic magnetic flows on the two-sphere.*  
Séminaire de géométrie et dynamique, ENS Lyon.



## Publications

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- Accepted    *On a local systolic inequality for odd-symplectic forms* (with J. Kang),  
**Portugaliae Mathematica**, arXiv:1902.01261, 52 pages.
- Invariance of symplectic cohomology and twisted cotangent bundles over surfaces* (with A. F. Ritter),  
**International Journal of Mathematics**, arXiv:1807.02086, 42 pages.
- A local contact systolic inequality in dimension three* (with J. Kang),  
**Journal of the European Mathematical Society**, arXiv:1902.01249, 43 pages.
- 2020        *Integrable magnetic flows on the two-torus: Zoll examples and systolic inequalities* (with L. Asselle),  
**Journal of Geometric Analysis** (2020), doi:10.1007/s12220-020-00379-1, 17 pages.
- 2019        *Minimal boundaries in Tonelli Lagrangian systems* (with L. Asselle and M. Mazzucchelli),  
**International Mathematical Research Notices** (2019), doi:10.1093/imrn/rnz246, 42 pages.
- 2017        *The multiplicity problem for periodic orbits of magnetic flows on the 2-sphere*  
(with A. Abbondandolo, L. Asselle, M. Mazzucchelli, and I. A. Taimanov),  
**Advanced Nonlinear Studies** 17 (2017), no. 1, 17–30.
- On the periodic motions of a charged particle in an oscillating magnetic field on the two-torus*  
(with L. Asselle),  
**Mathematische Zeitschrift** 286 (2017), no. 3-4, 843–859.
- 2016        *On closed orbits for twisted autonomous Tonelli Lagrangian flows*,  
Proceedings of the CIMP Research School "Hamiltonian and Lagrangian Dynamics",  
**Publicaciones Matemáticas del Uruguay** 16 (2016), 41–79.
- Magnetic Katok examples on the two-sphere*,  
**Bulletin of the London Mathematical Society** 48 (2016), no. 5, 855–865.
- The Lusternik-Fet theorem for autonomous Tonelli Hamiltonian systems on twisted cotangent bundles*  
(with L. Asselle),  
**Journal of Topology and Analysis** 8 (2016), no. 3, 545–570.
- The contact property for symplectic magnetic fields on  $S^2$* ,  
**Ergodic Theory and Dynamical Systems** 36 (2016), no. 3, 682–713.
- 2015        *On the existence of periodic orbits for magnetic systems on the two-sphere* (with K. Zehmisch),  
**Journal of Modern Dynamics** 9 (2015), 141–146.
- Infinitely many periodic orbits of non-exact oscillating magnetic fields on surfaces with genus at least two for almost every low energy level*  
(with L. Asselle),  
**Calculus of Variations and Partial Differential Equations** 54 (2015), no. 2, 1525–1545.
- 2014        *The contact property for magnetic flows on surfaces* (PhD Thesis),  
**University of Cambridge**.

## Submitted Manuscripts

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- 2020        *Normal forms for strong magnetic systems on surfaces: trapping regions and rigidity of Zoll systems*  
(with L. Asselle),  
arXiv:2003.09141, 19 pages.
- 2019        *On the local systolic optimality of Zoll contact forms* (with A. Abbondandolo),  
arXiv:1912.04187, 56 pages.
- On a systolic inequality for closed magnetic geodesics on surfaces* (with J. Kang),  
arXiv:1902.01262, 26 pages.

## Lectures and Seminars

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- Spring 2020  
Heidelberg - **Variational Methods for Convex Hamiltonian Systems**,  
Master seminar, 13 talks.
- Mar - Apr 2020  
Lahore - **Introduction to Complex Analysis (Part 2)**,  
Online lecture series with Alberto Abbondandolo, International Mathematics Master.
- Fall 2019/2020  
Heidelberg - **Differential Geometry II**,  
Master lecture, 4 hours per week, with lecture notes. Exercises by Dr. Kevin Wiegand.
- Spring 2019  
Heidelberg - **Differential Geometry I**,  
Bachelor Lecture, 4 hours per week, with lecture notes. Exercises by Dr. Urs Fuchs.
- Fall 2018/2019  
Heidelberg - **Integrable Systems and KAM Theory**,  
Master seminar, 14 talks, with lecture notes of the students.
- Spring 2018  
Heidelberg - **Geometry of Celestial Mechanics**,  
Master Lecture, 4 hours per week, with lecture notes.
- Sep 2016  
Leipzig - **Preparatory Course in Mathematics**,  
Intensive course for teachers, 2 hours every day for 2 weeks, with lecture notes.

## Exercise Classes and Tutoring

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- Fall 2017/2018  
Leipzig - *Differential Geometry 1*. Lecturer: Prof. Hans-Bert Rademacher.  
- *Basics of Mathematics*. Lecturer: Steffen Hintze.
- Spring 2017  
Leipzig - *Advanced Geometry*. Lecturer: Prof. Friedbert Prüfer.
- Fall 2016/2017  
Leipzig - *Differential Geometry 1*. Lecturer: Prof. Friedbert Prüfer.  
- *Analysis 3 (Mass and Integration)*. Lecturer: Prof. Hans-Bert Rademacher.
- Fall 2015/2016  
Münster - *Analysis 1*. Lecturer: Prof. Peter Albers.
- Fall 2012/2013  
Cambridge - *Differential Geometry*. Lecturer: Prof. Mihalis Dafermos.
- 2011 – 2014  
Cambridge - Tutor for the Bachelor lectures *Metric & Topological Spaces*, *Analysis II*, *Geometry 1B*,  
*Differential Geometry*. Coordinator: Prof. Imre Leader.

## Minicourses

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- Feb 2018 *Systolic inequalities in contact and symplectic geometry*, Graduate winter school in Hamiltonian dynamics and symplectic topology. University of Padova.
- Mar 2015 *On closed orbits for twisted autonomous Tonelli Lagrangian flows*, CIMPA Research School "Hamiltonian and Lagrangian Dynamics". CMAT, Universidad de la República, Uruguay.

## Outreach

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- 2019 Tutor for the *Mathematics Route* for kids during the *Day of Mathematics*. Heidelberg.
- 2011 Seminar *Mathematical Billiards* for high school students during the *Week of Mathematics*. Coordinator: Prof. Alberto Abbondandolo. Università di Pisa.

## Supervision of Students and Postdocs at the University of Heidelberg

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### *Postdoc*

Jan–Dec 2020    Amin Mohebbi, *Magnetic deformations of the Kepler problem.*

### *PhD*

Since Jan 2020    Johanna Bimmermann, *The relative HZ-capacity in two degrees of freedom.*

Since Sep 2019    Valerio Assenza, *On the curvature of magnetic flows.*

Since Apr 2018    Anna-Maria Vocke, *Tonelli billiards.* Co-advisor: Prof. Peter Albers.

### *Master*

Since Feb 2020    Raphael Schlarb, *The twist condition for strong magnetic fields on the two-sphere.*

May 2020        Davide Legacci, *Hamiltonian evolutionary dynamics.* Co-advisor: Prof. Kurt Roth.

Dec 2019        Johanna Bimmermann, *HZ capacity for magnetic systems on the two-sphere.*

### *Bachelor*

Since Feb 2020    Christian Alber, *The Blaschke conjecture and Hopf rigidity on surfaces.*

Since Feb 2020    Jonas von Berg, *Singularity Theorems in GR.* Co-advisor: Prof. Matthias Bartelmann.

Aug 2019        Johannes Wenzel, *Die Dynamik von Kreisdiffeomorphismen.*

July 4, 2020

# Biagio Cassano

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## Curriculum Vitae

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### Current position

Jul 2019 - **Ricercatore (TD - Tipo A)**, *Dipartimento di Matematica, Università degli Studi di Bari*, Bari, Italia.  
Now

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### Education and previous positions

Sep 2018 - **Post-doc**, *Nuclear Physics Institute of the Czech Academy of Sciences, Řež*  
Jul 2019 (Prague), Czech Republic, in the research group of Pavel Exner and David Krejčířík.  
Mar 2018 - **Post-doc**, *Basque Center for Applied Mathematics*, Bilbao, Spain,  
Jun 2018 INDAM fellowship "Mensilità di borse di studio per l'estero".  
Mar 2016 - **Post-doc**, *Basque Center for Applied Mathematics*, Bilbao, Spain, in the group  
Feb 2018 "Linear and Non-Linear Waves" of Luis Vega.  
Feb 2015 - **Post-doc**, "*Sapienza*" – *Università di Roma*, in the group of Piero D'Ancona  
Jan 2016 and Luca Fanelli.  
Nov 2011- **Ph.D.**, "*Sapienza*" – *Università di Roma*,  
Dec 2014 Supervisor: Prof. Piero D'Ancona.  
Sep-Dec 2013 **Internship**, *BCAM - Basque Center for Applied Mathematics*, Bilbao, Spain.  
Aug 2010 **Summer School**, *SMI - Scuola Matematica Interuniversitaria*, Perugia, Italy.  
2009–2011 **Laurea magistrale in Matematica**, *Università degli Studi di Bari*, Italy,  
(Orientamento Generale, classe LM-40), 110/110 cum Laude.  
2005–2009 **Laurea in Matematica**, *Università degli Studi di Bari*, Italy, 110/110 cum  
Laude.  
2005 **Maturità scientifica**, *Liceo E. Fermi*, Bari, Italy, 100/100 cum Laude.

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### Ph.D. Thesis

Title *Spacetime asymptotics for Schrödinger Equations*  
Date 19 Dicembre 2014  
Institute "*Sapienza*" – *Università di Roma*  
Supervisor Prof. Piero D'Ancona  
Description Some results on scattering for a fully variable Schrödinger equation and for systems of weakly coupled Schrödinger equations are discussed. Also, we obtain results related to the Hardy Uncertainty Principle and Gaussian decay of solutions to the Schrödinger equation.

Via Orabona 4 – 70125 Bari, Italia

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## Teaching

### Ph.D. Courses:

- 2019-2020 Course “Self-adjointness for unbounded operators on Hilbert spaces: perturbation theory and self-adjoint extensions” for the Ph.D. School in Informatics and Mathematics at “Università degli Studi di Bari”.

### University Courses:

- 2019-2020 Part of the course “Matematica” for the degree in Environmental Sciences of “Università degli Studi di Bari”.
- 2019-2020 Part of the course “Analisi Matematica” for the degree in Informatics and Digital communication of “Università degli Studi di Bari”.
- 2019-2020 Part of the course “Matematica” for the degree in Farmaceutical chemistry and technology of “Università degli Studi di Bari”.
- 2014 Assistant professor for “Mathematics 2” for the degree in “Economics” (in english language) at LUISS - Libera Università Internazionale degli Studi Sociali “Guido Carli” - Roma.
- 2012 Remedial course in Mathematics “OFA” (offerta formativa aggiuntiva) for first year students in Chemistry at “Sapienza” – Università di Roma.

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## Publications

1. B.C., Luca Fanelli, *Sharp Hardy uncertainty principle and gaussian profiles of covariant Schrödinger evolutions*, Transactions of the American Mathematical Society 367, 3 (2015) 2213-2233, Publisher: American Mathematical Society, DOI: 10.1090/S0002-9947-2014-06383-6.
2. B.C., Mirko Tarulli,  *$H^1$ -scattering for systems of  $N$ -defocusing weakly coupled NLS equations in low space dimensions*, Journal of Mathematical Analysis and Applications 430, 1 (2015) 528-548, Publisher: Academic Press Inc., DOI: 10.1016/j.jmaa.2015.05.008.
3. Andrea Braides, B.C., Adriana Garroni, David Sarrocco, *Quasi-static damage evolution and homogenization: A case study of non-commutability*, Annales de l'Institut Henri Poincaré (C) Non Linear Analysis 33, 2 (2016) 309-328, Publisher: Elsevier Masson SAS, DOI: 10.1016/j.anihpc.2014.10.003.
4. B.C., Piero D'Ancona, *Scattering in the energy space for the NLS with variable coefficients*, Mathematische Annalen 366, 1-2 (2016) 479-543, Publisher: Springer, DOI: 10.1007/s00208-015-1335-4.
5. B.C., Luca Fanelli, *Gaussian decay of Harmonic Oscillators and related models*, Journal of Mathematical Analysis and Applications 456, 1 (2017) 214-228, Publisher: Academic Press Inc., DOI: 10.1016/j.jmaa.2017.06.067.
6. B.C., Fabio Pizzichillo, *Self-Adjoint Extensions for the Dirac Operator with Coulomb-Type Spherically Symmetric Potentials*, Letters in Mathematical Physics, Volume 108, Issue 12, 1 December 2018, Pages 2635-2667, Publisher: Springer, DOI: 10.1007/s11005-018-1093-9.

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7. B.C., Fabio Pizzichillo, *Boundary triples for the Dirac operator with Coulomb-type spherically symmetric perturbations*, Journal of Mathematical Physics, Volume 60, Issue 4, 1 April 2019, Article number 041502, Publisher: American Institute of Physics Inc., DOI: 10.1063/1.5063986.
8. B.C., Fabio Pizzichillo, Luis Vega, *A Hardy-type inequality and some spectral characterizations for the Dirac-Coulomb operator*, Revista Matemática Complutense Volume 33, Issue 1, 1 January 2020. Publisher: Springer, DOI: 10.1007/s13163-019-00311-4.
9. B.C., Orif O. Ibrogimov, David Krejčířík, František Štampach, *Location of eigenvalues of non-self-adjoint discrete Dirac operators*, Annales Henri Poincaré volume 21, pages 2193–2217, 8 June 2020, Publisher: Springer, DOI: 10.1007/s00023-020-00916-2.

### Preprints

10. B.C., *Sharp exponential localization for solutions of the Perturbed Dirac Equation*, arXiv preprint arXiv:1803.00603 (2018).
11. B.C., Vladimir Lotoreichik, *Self-adjoint extensions of the two-valley Dirac operator with discontinuous infinite mass boundary conditions*, arXiv preprint arXiv:1907.13224 (2019), to appear in Operators and Matrices.

### Conferences

In the organizing committee of:

- Dec 2019 **EDP e DINTORNI - V Meeting around PDE**, Università degli Studi di Bari.
- Apr 2014 **Analysis of Relativistic and Non-Relativistic Models in Quantum Mechanics**, “Sapienza” – Università di Roma.

I have presented the talks:

- Sep 2014 **Scattering in the energy space for the NLS with variable coefficients**, Roman Summer School and Workshop on KAM Theory and Dispersive PDE's, “Sapienza” – Università di Roma - Argiletum, Università di Roma 3.
- Mar 2015 **Scattering in the energy space for Schrödinger equations**, Brainstorming on Hyperbolic Equations, Università degli Studi di Bari.
- Ott 2015 **Scattering per l'equazione di Schrödinger**, Università degli Studi di Bari.
- Dec 2015 **Hardy uncertainty principle and gaussian decay for solutions to the Schrödinger equation**, Xmaths Workshop 2015, Università degli Studi di Bari.
- Jun 2016 **Hardy uncertainty principle and gaussian decay for solutions to the Schrödinger equation**, BCAM - Basque Center for Applied Mathematics, Bilbao (Spain).
- Sep 2017 **Gaussian decay for solutions to the electromagnetic Schrödinger equation and Hardy uncertainty principle**, Cuarto Congreso de Jóvenes Investigadores, Universitat de València, Valencia (Spain).

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- Dec 2017 **Self-adjointness for the Dirac operator with Coulomb-type potentials**, *Xmaths Workshop 2017*, Università di Bari.
- Feb 2018 **Self-adjointness for the Dirac operator with Coulomb-type potentials**, *Mathematical Challenges in Quantum Mechanics 2018*, “Sapienza” – Università di Roma.
- May 2018 **Self-adjoint extensions for the Dirac operator with Coulomb-type spherically symmetric potentials**, Universidad de Valladolid, Valladolid, Spain.
- Dec 2018 **Sharp rate of exponential decay for eigenfunctions of perturbed Dirac operators**, Université de Franche-Comté, Besançon, France.
- Dec 2018 **Sharp rate of exponential decay for eigenfunctions of perturbed Dirac operators**, *IV Meeting around PDE*, Università degli studi di Bari.
- Mar 2019 **Self-adjointness and spectral properties for the Dirac operator with Coulomb-type perturbations**, *Differential operators on graphs and waveguides*, TU Graz, Austria.
- Jul 2019 **Sharp rate of exponential decay for eigenfunctions of perturbed Dirac operators**, *Dirac-2019: Waves, Particles, Spectra*, Steklov Institute of Mathematics of the Russian Academy of Sciences, St. Petersburg, Russia.
- Sep 2019 **Self-adjoint extensions of the two-valley Dirac operator with discontinuous infinite mass boundary conditions**, *Analytic and algebraic methods in physics*, Czech Technical University, Prague, Czech Republic.
- Ott 2019 **Sharp rate of exponential decay for eigenfunctions of perturbed Dirac operators**, *Asymptotic Analysis & Spectral Theory*, Institut de Mathématique d’Orsay, Orsay, France.
- Feb 2020 **Self-adjoint extensions of the two-valley Dirac operator with discontinuous infinite mass boundary conditions**, *Quantum Mechanics of Artificial Material Structure*, Sirius Mathematical Center, Sochi, Russia.

## Visiting periods

- May 2017 “Sapienza” – Università di Roma, May 2 to 5.
- Nov 2018 UVa - Universidad de Valladolid, Valladolid (Spain), November 6 to 9.
- Dec 2018 Université de Franche-Comté, Besançon (France), December 10 to 14.
- Nov 2019 Czech Technical University, Prague (Czech Republic), November 20 to 22.

## Awards & Grants

- 2015-16 Research fund “Avvio alla ricerca - TIPOLOGIA A” of “Sapienza” – Università di Roma for the project “Proprietà delle equazioni di Schrödinger e Helmholtz”.
- 2015 “Menzione speciale” for the prize “Premio Tesi di Dottorato 2014” in “Sapienza” – Università di Roma.
- 2014-15 Research fund “Avvio alla ricerca - TIPOLOGIA A” of “Sapienza” – Università di Roma for the project “Proprietà asintotiche per l’equazione di Schrödinger”.

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## Review activity

I am referee for “Mathematical Methods in the Applied Sciences”, “Zeitschrift für angewandte Mathematik und Physik”, “Journal of Nonlinear Analysis”, “Revista Matemática Iberoamericana”, “Transactions of AMS”, “Mathematische Nachrichten”, “INdAM-Springer series”.

## Computer skills

Good knowledge of  $\text{\LaTeX}$

Basic knowledge of MATLAB

## Languages

Italian	<b>Mother tongue</b>
Spanish	<b>Good</b>
English	<b>Good</b>

July 14, 2020

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Dipartimento di Matematica, Università degli Studi di Bari

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## Personal Information

First name(s) / Surname(s) **Azahara DelaTorre Pedraza**

## Current position

**Postdoctoral position: Research and Teaching assistant** (Wissenschaftliche Mitarbeiterin)

Dates April 2018 – August 2020

Name and address of employer Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)  
Analysis group (Prof. E. Kuwert and Prof. G. Wang)

**Postdoc Juan de la Cierva incorporación 2018 (Not started yet)**

Dates Starting September 2020

Name and address of employer Departamento de Análisis Matemático, Universidad de Granada (UGR), Spain

## Previous Postdoctoral positions

**Postdoctoral researcher**

Dates October 2017 – March 2018

Name and address of employer Dipartimento di Matematica, Università degli Studi di Padova (Italy)

Grant Project PP00P2-170588 “Non-linear and non-local differential equations in functional and geometric analysis” (Prof. Luca Martinazzi)

**Postdoctoral position** (Research and teaching)

Dates January 2017 – September 2017

Name and address of employer Departement Mathematik und Informatik, University of Basel (Switzerland)

Grant Nationalfonds-Projekt NMA 1647 (PP00P2-144669, PP00P2-170588/1 and P2BSP2-172064 ) (Dr. Luca Martinazzi)

## Accreditations

**Informe favorable “professor/a lector/a”**

Date 14 April 2020

Organisation Agència per a la Qualitat del Sistema Universitari de Catalunya (AQU)

**Evaluación positiva “Profesor Ayudante Doctor”**

Date 19 June 2017

Organisation Agencia Nacional de Evaluación de la Calidad y Acreditación (ANECA)

## Graduate education

**PhD scholarship**

Dates December 2012 – November 2016

Occupation or position held *Beca FPI (Research staff training grant)*

Name and address of employer Universitat Politècnica de Catalunya, Barcelona (Spain)

Advisor María del Mar González Noguerras

PhD thesis Title On the fractional Yamabe problem with isolated singularities and related issues  
 Thesis defense date 19<sup>th</sup> December 2016  
 Grade Excellent, Cum Laude. International mention.

**Master's Degree in Advanced Mathematics and Mathematical Engineering**

Dates October 2012 – October 2013  
 Type of qualification awarded 9.1 (out of 10)  
 Name and type of organisation providing education and training Faculty of Mathematics and Statistics, Universitat Politècnica de Catalunya, Barcelona (Spain)

**Undergraduate education**

**Degree in Mathematics**

Dates September 2012  
 Type of qualification awarded Second class honours, upper division (8,008 out of 10 in the Spanish original scale)  
 Principal subjects/occupational skills covered - Geometry  
 - Topology  
 Name and type of organisation providing education and training Faculty of Science, University of Granada, Granada (Spain)

**Undergraduate fellowships**

**Department: GEOMETRY AND TOPOLOGY**

Dates Academic year 2011 – 2012  
 Occupation or position held *BECA DE COLABORACIÓN 2011/2012* (A scholarship granted for collaborating with the Geometry and Topology department)  
 Main activities and responsibilities Working with the department and analysing research studies on minimal and constant mean curvature surfaces in  $H^3$  and  $H^2 \times \mathbb{R}$   
 Name and address of employer University of Granada, Granada (Spain)  
 Advisor Francisco Martín Serrano

**Department: GEOMETRY AND TOPOLOGY**

Dates July 2011 – May 2012  
 Occupation or position held *BECA DE INICIACIÓN A LA INVESTIGACIÓN* (A scholarship granted to allow students to take the first steps into research)  
 Main activities and responsibilities Study of constant mean curvature surfaces and related problems  
 Name and address of employer University of Granada, Granada (Spain)  
 Advisor Francisco Martín Serrano

**Long term research visits**

**Postdoctoral visitor in the Mathematics department at “Università Roma Tre”, Italy, following an invitation by Luca Battaglia**

Dates 15<sup>th</sup> September - 16<sup>th</sup> October 2019  
 Name and type of organisation providing education and training Department of Mathematics at Università Roma Tre (Italy).

**PhD visitor in the Mathematics department at “Universidad Autónoma de Madrid”, Spain, following an invitation by professor María del Mar González**

Dates 24<sup>th</sup> July - 5<sup>th</sup> August 2016 and 1<sup>st</sup> September - 16<sup>th</sup> September 2016

Name and type of organisation providing education and training	Department of Mathematics at Universidad Autónoma de Madrid, Madrid (Spain).
	<b>PhD visitor in the Mathematics department at “The University of British Columbia”, Canada, following an invitation by professor Juncheng Wei</b>
Dates	19 <sup>th</sup> September – 20 <sup>th</sup> December 2015
Name and type of organisation providing education and training	Department of Mathematics at University of British Columbia, Vancouver (Canada).
	<b>PhD visitor in the Mathematics department at Princeton University, USA, following an invitation by professor Alice Chang</b>
Dates	9 <sup>th</sup> September – 26 <sup>th</sup> October 2013 9 <sup>th</sup> November – 18 <sup>th</sup> December 2013
Name and type of organisation providing education and training	Mathematics department at Princeton University, Princeton (USA).

## Short term research visits

	<b>Postdoctoral visitor in Dipartimento SBAI in Sapienza University of Roma (Italy), following an invitation by professor Angela Pistoia.</b>
Dates	4 <sup>th</sup> -22 <sup>nd</sup> March 2020
Name and type of organisation providing education and training	Sapienza University of Roma (Italy)
	<b>Postdoctoral visitor in Departamento de Análisis, Universidad de Granada, following an invitation by professor David Ruiz.</b>
Dates	3 <sup>rd</sup> -13 <sup>th</sup> September 2019
Name and type of organisation providing education and training	Universidad de Granada, Granada (Spain)
	<b>Postdoctoral visitor in Dipartimento SBAI in Sapienza University of Roma (Italy), following an invitation by professor Angela Pistoia.</b>
Dates	1 <sup>st</sup> -5 <sup>th</sup> April 2019
Name and type of organisation providing education and training	Sapienza University of Roma (Italy)
	<b>Postdoctoral visitor in the Mathematics department at “Universidad Católica de Chile”, Chile, following an invitation by professor Mariel Saéz.</b>
Dates	8 <sup>th</sup> March - 28 <sup>st</sup> March 2019
Name and type of organisation providing education and training	Universidad Católica de Chile, Santiago de Chile (Chile)
	<b>Postdoctoral visitor in the Mathematics department at “Wuhan University”, China, following an invitation by professor Weiwei Ao.</b>
Dates	11 <sup>th</sup> October - 21 <sup>st</sup> October 2018
Name and type of organisation providing education and training	Wuhan University, Wuhan (China).
	<b>Postdoctoral visitor in the Mathematics department at “Freiburg University”, Germany, following an invitation by professor Ernst Kuwert.</b>
Dates	22 <sup>nd</sup> January - 27 <sup>th</sup> January 2018
Name and type of organisation providing education and training	Albert-Ludwigs-Universität Freiburg, Mathematisches Institut (Germany).
	<b>Postdoctoral visitor in the Mathematics department at “Universidad Autónoma de Madrid”, Spain, following an invitation by professor María del Mar González</b>

Dates	14 <sup>th</sup> October - 29 <sup>th</sup> October 2017 19 <sup>th</sup> December - 21 <sup>st</sup> December 2017 7 <sup>th</sup> January - 14 <sup>th</sup> January 2018 2 <sup>nd</sup> February 2018 15 <sup>th</sup> June - 25 <sup>th</sup> June 2018 28 <sup>th</sup> February -8 March 2019
Name and type of organisation providing education and training	Department of Mathematics at Universidad Autónoma de Madrid, Madrid (Spain).  <b>PhD visitor in the Sciences Research Institute (MSRI) in Berkeley, CA, USA, following an invitation by professor María del Mar González, while she was visiting member at MSRI</b>
Dates	23 <sup>rd</sup> January - 1 <sup>st</sup> February 2016
Name and type of organisation providing education and training	Research Institute (MSRI) in Berkeley, CA, USA.  <b>PhD visitor in the Mathematics department at “Universidad Autónoma de Madrid”, Spain, following an invitation by professor María del Mar González</b>
Dates	27 <sup>th</sup> November - 30 <sup>th</sup> November 2016
Name and type of organisation providing education and training	Department of Mathematics at Universidad Autónoma de Madrid, Madrid (Spain).

## Publications

<b>Sign-changing solutions for the one-dimensional non-local sinh-Poisson equation.</b>	
Authors	DelaTorre, G. Mancini and A. Pistoia.
Note	To appear in <b><i>Advanced Nonlinear Studies</i></b> . (Available at <a href="https://arxiv.org/abs/2005.09909">arXiv:2005.09909</a> ).
<b>An analytic construction of singular solutions related to a critical Yamabe problem.</b>	
Authors	H. Chan, A. DelaTorre
Note	To appear in <b><i>Communications in Partial Differential Equations</i></b> . ISSN: 0360-5302 (Print) 1532-4133 (Online) Journal homepage: <a href="https://www.tandfonline.com/loi/lpde20">https://www.tandfonline.com/loi/lpde20</a>
DOI	<a href="https://doi.org/10.1080/03605302.2020.1784209">10.1080/03605302.2020.1784209</a> . (Available at <a href="https://arxiv.org/abs/1912.10352">arXiv: 1912.10352</a> ).
<b>ODE-methods in non-local equations.</b>	
Authors	W. Ao, H. Chan, A. DelaTorre, M. Fontelos, M.d.M González and J. Wei.
Note	To appear in <b><i>Journal of Mathematical Study</i></b> . (Available at <a href="https://arxiv.org/abs/1910.14512">arXiv:1910.14512</a> .)
<b>Concentration phenomena for the fractional Q-curvature equation in dimension 3.</b>	
Authors	A. DelaTorre , M.d.M González, A. Hyder and L. Martinazzi
Note	Preprint. Available at <a href="https://arxiv.org/abs/1812.10565">arXiv:1812.10565</a> .
<b>Improved Adams-type inequalities and their extremals in dimension 2m.</b>	
Authors	A. DelaTorre and G. Mancini
Note	To appear in <b><i>Communications in Contemporary Mathematics (CCM)</i></b> .
DOI	<a href="https://doi.org/10.1142/S0219199720500431">10.1142/S0219199720500431</a> . (Available at <a href="https://arxiv.org/abs/1711.00892">arXiv:1711.00892</a> ).
<b>The non-local mean-field equation on an interval.</b>	
Authors	A. DelaTorre , A. Hyder, L. Martinazzi and Y. Sire
Note	<b><i>Communications in Contemporary Mathematics (CCM)</i></b> . (2019) 1950028 (19 pages)

DOI [10.1142/S0219199719500287](https://doi.org/10.1142/S0219199719500287). (Available at [arXiv 1812.02165](https://arxiv.org/abs/1812.02165)).

**On higher dimensional singularities for the fractional Yamabe problem: a non-local Mazzeo-Pacard program.**

Authors W. Ao, A. DelaTorre H. Chan, M. Fontelos, M.d.M González and J. Wei.

Journal **Duke Math. J.** 168 (2019), no. 17, 3297–3411.

DOI [10.1215/00127094-2019-0034](https://doi.org/10.1215/00127094-2019-0034). (Available at [arXiv:1802.07973](https://arxiv.org/abs/1802.07973)).

**A gluing approach for the fractional Yamabe problem with isolated singularities.**

Authors W. Ao, A. DelaTorre M.d.M González and J. Wei

Note **Journal für die reine und angewandte Mathematik (Crelle journal)**, 2020 (763), 28-78

DOI [10.1515/crelle-2018-0032](https://doi.org/10.1515/crelle-2018-0032). (Available at [arXiv:1609.08903](https://arxiv.org/abs/1609.08903)).

**Isolated singularities for a semilinear equation with fractional Laplacian arising in conformal geometry.**

Authors A. DelaTorre and M.d.M González

Journal **Revista Matemática Iberoamericana** 34 (2018), no. 4, 1645–1678. 35 (53A30)

DOI [10.4171/rmi/1038](https://doi.org/10.4171/rmi/1038). (Available at [arXiv:1504.03493](https://arxiv.org/abs/1504.03493)).

**Delaunay solutions for the fractional Yamabe problem.**

Authors A. DelaTorre, M. del Pino, M.d.M González and J. Wei.

Journal **Mathematische Annalen** (2017), 1-2, 597-626

DOI [10.1007/s00208-016-1483-1](https://doi.org/10.1007/s00208-016-1483-1) (Available at [arXiv:1510.0850](https://arxiv.org/abs/1510.0850) ).

## Awards

**Premio Extraordinario de doctorado**

Awarding organization Universitat Politècnica de Catalunya (27/09/2019)

**International competitions for postdoctoral positions (gained)**

Awarding organization Juan de la Cierva incorporación 2018

Awarding organization FONDECYT proposal to become a postdoctoral researcher at Pontificia Universidad Católica de Chile starting by March 15, 2018

Awarding organization ERCIM Alain Bensoussan Fellowship Programme call 2017 (2)

Awarding organization Postdoctoral position at Université de Mons starting by January 2017

Awarding organization ERCIM Alain Bensoussan Fellowship Programme call 2017 (1)

## Grants (As main researcher)

**Projekt DFG-GZ: 3327/1-1 ; AOBJ: 667532 “Nichtlokale und nichtlineare PDEs: ein geometrischer Zugang.”**

Total amount: 191.300 €

Main Researcher / IP Azahara DelaTorre

Duration: 24 Months

Financial institution: DFG (Deutsche Forschungsgemeinschaft)

Dates: Not started yet

## **Grants** (As participant)

### **MTM2017-85757-P “Ecuaciones no lineales y no locales. Difusión y geometría”**

Total amount: 16000 €  
Main Researchers / IP Matteo Bonforte and María del Mar González Nogueras  
Total number of participants 25 researchers  
Financial institution: Ministerio de Economía, Industria y competitividad (Gobierno de España)  
Participant institution: Universidad Autónoma de Madrid (main institution) and George Washington, UT Austin, Princeton, UCLA, Paris, Stanford, John Hopkins, Imperial, UCSC, KTH, Universidad, Católica de Chile, Bath, ICMAT, UBC, Freiburg University.  
Dates: 01/01/2017-31/12/2019

### **“Non-linear and non-local differential equations in functional and geometric analysis” with code PP00P2\_170588**

Total amount: CHF 546'387.00  
Main Researcher / IP Luca Martinazzi  
Total number of participants 3 researchers  
Financial institution: Swiss National Fond.  
Participant institution: Unibas (Basel University, Switzerland) and UniPD (Padova University, Italy)  
Dates: 01/07/2017 - 31/09/2018

### **“Non-linear and non-local differential equations in functional and geometric analysis” with code PP00P2\_144669**

Total amount: CHF 1'411'031.00  
Main Researcher / IP Luca Martinazzi  
Total number of participants 10 researchers  
Financial institution: Swiss National Fond.  
Participant institution: Unibas (Basel University)  
Dates: 01/07/2013 - 30/06/2017

### **MTM2014-52402- C3-1-P “Ecuaciones en derivadas parciales: problemas de reacción-difusión, integro-diferenciales y geométricos”**

Total amount: 95,711.00 €  
Main Researcher / IP Xavier Cabré Vilagut  
Total number of participants 20  
Financial institution: Ministerio de Economía, Industria y competitividad (Gobierno de España)  
Participant institution: UPC (Universitat Politècnica de Catalunya), UAB (Universitat Autònoma de Barcelona) and UdG (Universitat de Girona)  
Dates: 01/01/2015-31/12/2017

### **2014SGR1083 “Equacions diferencials en derivades parcials i aplicacions”**

Total amount: 0 €  
Main Researcher / IP Xavier Cabré Vilagut  
Total number of participants 21 researchers  
Financial institution: AGAUR (Gen Cat)

Participant institution: UPC (Universitat Politècnica de Catalunya), UAB (Universitat Autònoma de Barcelona) and UdG (Universitat de Girona)

Dates: 01/01 2014 – 31/12/2016

**MTM2011-27739-C04-01 “Ecuaciones en derivadas parciales: problemas de reacción difusión y problemas geométricos”**

Total amount: 192.995,00 €

Main Researcher / IP Xavier Cabré Vilagut

Total number of participants 16

Financial institution: Ministerio de Economía, Industria y competitividad (Gobierno de España)

Participant institution: Universitat Politècnica de Catalunya (Main) and Universitat Autònoma de Barcelona, Universitat de Girona and Centre de Recerca Matemàtica

Dates: 01/01/2012-31/12/2014 (Expanded until 31/12/2015)

## Teaching assignment

Date 2<sup>nd</sup> Semester, academic year 2019-2020

Subject Lecturer for the course “**Non-local elliptic equations**” (2h / week), (Master and PhD Students of Mathematics).

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 2<sup>nd</sup> Semester, academic year 2019-2020

Subject Assistant for the course “**Elementary Differential Geometry**” (4+2 hours / week), (Students of Math degree and Master).

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 1<sup>st</sup> Semester, academic year 2019-2020

Subject Assistant for the course “**Analysis I**” (4+2 hours / week), (Students of Math and Teacher’ degrees).

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 1<sup>st</sup> Semester, academic year 2019-2020

Subject Assistant for the weekly **seminar “Geometric Analysis”** (2h / week),

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 2<sup>nd</sup> Semester, academic year 2018-2019

Subject Lecturer for the course “**Introduction to Parabolic Partial Differential Equations**” (4h / week), (Master and PhD Students of Mathematics).

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 1<sup>st</sup> Semester, academic year 2018-2019

Subject Assistant for the course “**Geometric Analysis**” (4+2 hours / week), (Master and PhD Students of Mathematics).

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 1<sup>st</sup> Semester, academic year 2018-2019

Subject Assistant for the **seminar “Minimal Surfaces”** (2h / week),  
(Students of Math degree and Master).

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 2<sup>nd</sup> Semester, academic year 2017-2018

Subject Assistant for the **seminar “Geometric Analysis”** (2h / week),  
(Students of Math degree and Master).

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 2<sup>nd</sup> Semester, academic year 2017-2018

Subject Assistant for the course **“Elementary Differential Geometry”** (4+2 hours / week),  
(Students of Math degree and Master).

Name and type of organisation providing education and training Mathematisches Institut Albert-Ludwigs. Universität Freiburg (Germany)

Date 2<sup>nd</sup> Semester, academic year 2016-2017

Subject Practical course **“Introduction to Fourier Analysis”**  
Cod. FS17

Name and type of organisation providing education and training Departement Mathematik und Informatik, Universität Basel, Basel (Switzerland)

Date 2<sup>nd</sup> Semester, academic year 2015-2016

Subject **“Calculus II”** (Engineering underdegree: EM/ETI/EQ)  
Cod. 240022

Name and type of organisation providing education and training ETSEIB, Universitat Politècnica de Catalunya, Barcelona (Spain).

## Research courses given

### Mini-course **“Fractional Yamabe problem with singularities”**

Date 27<sup>th</sup>, 28<sup>th</sup>, 29<sup>th</sup> September and 10<sup>th</sup>, 11<sup>th</sup> October 2019

Name and type of organisation providing education and training Roma Tre University (Italy)

## Other teaching experience

### Voluntary teacher at the Summer school **“Programa Campus Científicos de Verano 2015”**: Math Summer school for the best Spanish students which is held during the summer before entering High School

Date 28<sup>th</sup> June - 25<sup>th</sup> July 2015

Name and type of organisation providing education and training Campus de Excelencia Internacional Energía UPC  
University of Barcelona, Barcelona (Spain).

Talk at the **“Thirteenth Conference on Mathematics Teaching and Learning aimed at observing and acting”** presenting the paper **“Classifying quadrilaterals, something more than knowing the names”** as co-author.



Dates 10<sup>th</sup> - 12<sup>th</sup> September 2010  
 Name and type of organisation providing education and training Andalusian Society of Mathematical Education Thales, in collaboration with the University of Córdoba and the Teaching Centre in Córdoba, Córdoba (Spain).

**Associate student in the Teaching Innovation Project: “Academic and professional guidance for Mathematics students through personal in-person activities” (code 10-106) for its first edition and (code 11-247) for its second edition (collaborating with the organization, start-up, coordination and analysis of results)**

Dates February – April 2010  
 Name and type of organisation providing education and training University of Granada, Granada (Spain).

## Invited Talks

### ***ODE methods in non-local equations***

Date 16<sup>th</sup> June 2020  
 Name and type of organisation providing education and training Seminar at “Angewandte Mathematik”, Institute of Mathematics, University of Freiburg.

### ***Concentration phenomena for the fractional Q-curvature equation in dimension 3 and fractional Poisson formulas .***

Date 22<sup>nd</sup> January 2020  
 Name and type of organisation providing education and training MATRIX Program: “Early Career Researchers Workshop on Geometric Analysis and PDEs”. MATRIX Creswick, Victoria, (Australia)

### ***Concentration phenomena for the fractional Q-curvature equation in dimension 3 and fractional Poisson formulas .***

Date 9<sup>th</sup> October 2019  
 Name and type of organisation providing education and training Seminar at Roma Tre University (Italy)

### ***Concentration phenomena for the fractional Q-curvature equation in dimension 3 and fractional Poisson formulas .***

Date 5<sup>th</sup> September 2019  
 Name and type of organisation providing education and training Seminar at “IEMath-GR” Universidad de Granada (España)

### ***The non-local mean-field equation on an interval.***

Date 8<sup>th</sup> May 2019  
 Name and type of organisation providing education and training Talk at “Nonlinear Geometric PDE’s” BIRS–BANFF (Canada)

### ***On the fractional Yamabe problem with singularities.***

Date 2<sup>nd</sup> May 2019  
 Name and type of organisation providing education and training Talk at “Fourth Meeting for Young Women in Mathematics” – University of Freiburg (Germany)

### ***Concentration phenomena for the fractional Q-curvature equation in dimension 3 and fractional Poisson formulas .***

Date 3<sup>rd</sup> April 2019

Name and type of organisation providing education and training Seminar at "Dipartimento SBAI" Sapienza Università di Roma (Italy)

***On higher dimensional singularities for the fractional Yamabe problem.***

Date 19<sup>th</sup> March 2019

Name and type of organisation providing education and training Seminar at Mathematics department of Pontificia Universidad Católica de Chile, Santiago de Chile (Chile)

***On higher dimensional singularities for the fractional Yamabe problem.***

Date 11<sup>th</sup> December 2018

Name and type of organisation providing education and training Talk in the Winter meeting on nonlocal PDEs and applications, UAM Madrid (Spain).

***On higher dimensional singularities for the fractional Yamabe problem.***

Date 18<sup>th</sup> September 2018

Name and type of organisation providing education and training Talk at the session "Advances in Nonlinear Elliptic and Parabolic PDEs: from local to nonlocal problems" in the joint meeting "2018 UMI-SIMAI-PTM" Wroclaw (Poland).

***On higher dimensional singularities for the fractional Yamabe problem.***

Date 13<sup>th</sup> June 2018

Name and type of organisation providing education and training Talk at the conference "INDAM-Non linear PDEs in Geometry and Physics" Palazzone di Cortona (Italy).

***Non local methods for the fractional Yamabe problem with singularities.***

Date 31<sup>st</sup> May 2018

Name and type of organisation providing education and training Talk at the conference "Variational and PDE problems in Geometric Analysis, Università di Bologna (Italy).

***Improved Adams-type inequalities and their extremals in dimension 2m***

Date 22<sup>nd</sup> May 2018

Name and type of organisation providing education and training Talk at the "Summer School 2018 EWM-EMS" Institut Mittag Leffler (Sweden).

***Improved Adams-type inequalities and their extremals in dimension 2m***

Date 21<sup>st</sup> February 2018

Name and type of organisation providing education and training Talk at the conference "Young PDE's @ Roma", Dipartimento SBAI, La Sapienza Università di Roma (Italy)

***Non-local Gluing methods for the fractional Yamabe problem with singularities***

Date 5<sup>th</sup> February 2018

Name and type of organisation providing education and training Seminar at "departamento de Matemáticas", Universidad de Córdoba (Córdoba, Spain)

***Improved Adams-type inequalities and their extremals in dimension 2m***

Date 23<sup>rd</sup> January 2018

Name and type of organisation providing education and training Seminar at "mathematical institute Albert Ludwigs", University of Freiburg (Germany)

***Non-local Gluing methods for the fractional Yamabe problem with singularities***

Date 10<sup>th</sup> January 2018

Name and type of organisation providing education and training Seminar at ICMAT (Madrid, Spain)

***Gluing methods for the fractional Yamabe problem with isolated singularities***

Date 8<sup>th</sup> September 2017

Name and type of organisation providing education and training Talk at the conference "IV Congreso de Jóvenes Investigadores RSME" held at Universitat de Valencia (Spain)

***On the fractional Yamabe problem with isolated singularities and related issues.***

Date 7<sup>th</sup> August 2017

Name and type of organisation providing education and training Talk at the analysis group seminar at Freiburg University (Germany)

***Gluing methods for the fractional Yamabe problem with isolated singularities***

Date 28<sup>th</sup> June 2017

Name and type of organisation providing education and training Talk at the conference "Nonlinear Analysis in Rome" held at the University of Notre Dame's Rome Global Gateway, in Rome (Italy)

***Gluing methods for the fractional Yamabe problem with isolated singularities***

Date 23<sup>rd</sup> May 2017

Name and type of organisation providing education and training Talk at the conference "Geometric Properties of Local and non-Local PDEs (17w5047)" held in Casa Matemática Oaxaca (CMO-BIRS).

***On the fractional Yamabe problem with isolated singularities***

Date 30<sup>th</sup> November 2016

Name and type of organisation providing education and training Talk at the joint Seminar (UAM, UC3M, UCM, UPM and URJC) "Difusión no lineal en Madrid" held in Universidad Autónoma de Madrid

***Delaunay-type solutions for the singular fractional Yamabe problem***

Date 13<sup>th</sup> July 2016

Name and type of organisation providing education and training Communication in JISD2016 – 14<sup>th</sup> WORKSHOP ON INTERACTIONS BETWEEN DYNAMICAL SYSTEMS AND PARTIAL DIFFERENTIAL EQUATIONS held in FME (UPC), Barcelona (Spain).

***Delaunay-type solutions for a fractional Laplacian equation arising in conformal geometry***

Date 1<sup>st</sup> July 2016

Name and type of organisation providing education and training Talk in the EWM-EMS summer school "Geometric and Physical aspects of Trudinger-Moser type inequalities" held at Institut Mittag-Leffler. Auravägen, Djursholm (Sweden).

***Some results on the singular fractional Yamabe problem.***

Date 6<sup>th</sup> June 2016

Name and type of organisation providing education and training Talk at the "Conferences on Recent Trends on Elliptic Nonlocal Equations" held at Fields institute (University of Toronto), Toronto (Canada).

***Delaunay-type solutions for a fractional Laplacian equation arising in conformal geometry***

Date 17<sup>th</sup> October 2015

Name and type of organisation providing education and training Talk at the "Pacific Northwest Geometry Seminar" held at the University of Washington in Seattle (USA).

***ODE solutions for the fractional Laplacian equations arising in conformal geometry***

Date 13<sup>th</sup> October 2015

Name and type of organisation Invited lecture in the “seminar in PDE, Differential Geometry, Mathematical Physics”. University of providing education and training British Columbia, Vancouver (Canada).

***ODE solutions for the fractional Laplacian equations arising in conformal geometry.***

Date 7<sup>th</sup> September 2015

Name and type of organisation Talk at the “III Congreso de Jóvenes investigadores RSME”. Universidad de Murcia, Murcia (Spain). providing education and training

***ODE solutions for the fractional Laplacian equations arising in conformal geometry***

Date 23<sup>rd</sup> June 2015

Name and type of organisation Talk at the “International workshop on conformal geometry and geometric PDE (Part I)”. providing education and training Beijing International Center for mathematical Research (Peking University), Peking (China).

***Delaunay-type solutions for the fractional Yamabe problem: the variational approach***

Date 16<sup>th</sup> March 2015

Name and type of organisation Talk in “Princeton-Tokyo workshop on Geometric analysis”. providing education and training University of Tokyo, Tokyo (Japan).

***ODE solutions for the fractional Laplacian equations arising in conformal geometry***

Date 11<sup>th</sup> December 2014

Name and type of organisation GREDPA (Research group in partial differential equations and applications). providing education and training Universitat Politècnica de Catalunya, Barcelona (Spain).

***ODE solutions for the fractional Laplacian equations arising in conformal geometry***

Date 7<sup>th</sup> November 2014

Name and type of organisation Geometry Seminar (Geometry and Topology department). providing education and training University of Granada, Granada (Spain).

## **Events organized**

**Special Session “From Nonlinear to Nonlocal Differential Equations” at “V Congreso de Jóvenes Investigadores” Castelló 2020**

Date 27<sup>th</sup> -31<sup>st</sup> January 2020

Name and type of organisation Real Sociedad Matemática Española y Universidad Jaume I (Castellón). providing education and training

**“II Junior Meeting” arranged by Barcelona Graduate School of Mathematics**

Date 13<sup>th</sup> May 2016

Name and type of organisation Institut d'Estudis Catalans (IEC), Barcelona (Spain). providing education and training

**“I Junior Meeting” arranged by Barcelona Graduate School of Mathematics**

Date 11<sup>th</sup> December 2015

Name and type of organisation Facultat de Matemàtiques, Universitat de Barcelona, Barcelona (Spain). providing education and training

## **Scientific and administrative responsibilities**

Referee for several journals, including: Acta Applicandae Mathematicae, Communications on Pure and Applied Analysis, Journal of functional Analysis, Communications in Analysis and Geometry, J. Diff. Geo. and Appl...

## Conferences attended

### **Intensive Week on PDEs on the WEB**

Date 8<sup>th</sup> -12<sup>th</sup> June 2020

Name and type of organisation Università degli Studi di Torino, Università di Roma "La Sapienza" and Universidade de Lisboa.  
providing education and training

### **Geometric Analysis and General Relativity. A conference in honour of G. Huisken's 60th Birthday.**

Date 3<sup>rd</sup> -7<sup>th</sup> June 2019

Name and type of organisation ETH (Zurich, Switzerland).  
providing education and training

### **Workshop "PDE and Geometric Measure Theory"**

Date 23<sup>rd</sup> September- 2<sup>nd</sup> October 2018

Name and type of organisation ETH (Zurich, Switzerland).  
providing education and training

### **Joint meeting joint meeting "2018 UMI-SIMAI-PTM" in Wroclaw (Poland).**

Date 17<sup>th</sup> -20<sup>th</sup> September 2018

Name and type of organisation University of Wroclaw (Poland).  
providing education and training

### **Geometric PDEs in Freiburg**

Date 23<sup>rd</sup> - 27<sup>th</sup> July 2018

Name and type of organisation University of Freiburg (Germany).  
providing education and training

### **XXXVIII Convegno Nazionale di Calcolo delle Variazioni**

Date 11<sup>th</sup> – 16<sup>th</sup> January 2018

Name and type of organisation The CIRM (Centro Internazionale per la Ricerca Matematica).  
providing education and training

### **CIME Session 2017 on "Geometry of PDE's and related problems"**

Date 19<sup>th</sup> – 23<sup>rd</sup> June 2017

Name and type of organisation The CIME (International Mathematical Summer Center) Foundation  
providing education and training

### **"Nonlinear diffusion and free boundary problems. A conference on the occasion of the 70th anniversary of Juan Luis Vázquez"**

Date 17<sup>th</sup> – 19<sup>th</sup> May 2017

Name and type of organisation Universidad Autónoma de Madrid, Madrid (Spain)  
providing education and training

### **"Minischool on Recent Trends in PDEs"**

Date 22<sup>nd</sup> – 29<sup>th</sup> March 2017

Name and type of organisation Universidad Autónoma de Madrid, Madrid (Spain)  
providing education and training

### **"Centro di Ricerca Matematica Ennio De Giorgi (held Palazzo dei Congressi), Pisa (Italy)."**

Date 20<sup>h</sup> – 24<sup>th</sup> February 2017

Name and type of organisation providing education and training	Centro di Ricerca Matematica Ennio De Giorgi, Scuola Normale Superiore, Pisa (Italy).
	<b>"A Mathematical Tribute to Ennio De Giorgi"</b>
Date	19 <sup>th</sup> – 23 <sup>rd</sup> September 2016
Name and type of organisation providing education and training	Centro di Ricerca Matematica Ennio De Giorgi (held Palazzo dei Congressi), Pisa (Italy).
	<b>"Workshop on Non-Local Variational Problems and PDEs"</b>
Date	13 <sup>th</sup> - 17 <sup>th</sup> June 2016
Name and type of organisation providing education and training	University of British Columbia, Vancouver (Canada).
	<b>"Focus Program on Nonlocal Partial Differential Equations"</b>
Date	16 <sup>th</sup> May - 10 <sup>th</sup> June, 2016
Scheduled as	Conferences on Recent Trends on Elliptic Nonlocal Equations (May 16-20, 2016) Mini-courses on nonlocal Partial Differential Equations (May 23-June 3, 2016) Conferences on Qualitative Aspects of the Theory of Nonlocal Equations (June 6-10, 2016)
Name and type of organisation providing education and training	Fields institute (University of Toronto), Toronto (Canada).
	<b>"Introductory Workshop: Modern Riemannian Geometry Workshop"</b>
Date	18 <sup>th</sup> - 22 <sup>nd</sup> January 2016
Name and type of organisation providing education and training	Mathematical Sciences Research Institute in Berkeley, California (USA).
	<b>"Connection for Women: Differential Geometry Workshop"</b>
Date	14 <sup>th</sup> -15 <sup>th</sup> January 2016
Name and type of organisation providing education and training	Mathematical Sciences Research Institute in Berkeley, California (USA).
	<b>International workshop on conformal geometry and geometric PDE (Part II)</b>
Dates	29 <sup>th</sup> June – 3 <sup>rd</sup> July 2015
Name and type of organisation providing education and training	Beijing International Center for mathematical Research (Peking University), Beijing (China).
	<b>Thirteenth Workshop on Interactions between Dynamical System and Partial Differential Equations (JISD2015)</b>
Dates	1 <sup>st</sup> – 5 <sup>th</sup> June 2015
Name and type of organisation providing education and training	Universitat Politècnica de Catalunya, Barcelona (Spain)
	<b>Summer Course and Workshop "NSF FRG: Calculus of Variations and Nonlinear Partial Differential Equations "</b>
Dates	18 <sup>th</sup> – 29 <sup>th</sup> May 2015
Name and type of organisation providing education and training	University of Texas, Austin (USA).
	<b>Workshop "Non local days in Basel"</b>
Dates	15 <sup>th</sup> – 17 <sup>th</sup> December 2014
Name and type of organisation providing education and training	University of Basel, Basel (Switzerland).
	<b>Summer School on Geometric Measure Theory and Geometric Analysis</b>
Dates	23 <sup>rd</sup> – 27 <sup>th</sup> June 2014
Name and type of organisation providing education and training	University of Basel, Basel (Switzerland).
	<b>Twelfth Workshop on Interactions between Dynamical Systems and Partial Differential Equations (JISD2014)</b>
Dates	16 <sup>th</sup> – 20 <sup>th</sup> June 2014

Name and type of organisation providing education and training	Universitat Politècnica de Catalunya, Barcelona (Spain)
	<b>2014 Center for Mathematics at Notre Dame Thematic Program on Nonlinear PDEs in Geometry and Physics</b>
Dates	9 <sup>th</sup> – 13 <sup>rd</sup> June 2014
Name and type of organisation providing education and training	The University of Notre Dame, Notre Dame (USA).
	<b>CIME Session 2014 on “Partial Differential Equations and Geometric Measure Theory”</b>
Dates	2 <sup>nd</sup> – 7 <sup>th</sup> June 2014
Name and type of organisation providing education and training	The CIME (International Mathematical Summer Center) Foundation
	<b>Workshop on Partial Differential Equations and applications</b>
Dates	20 <sup>th</sup> – 21 <sup>st</sup> February 2014
Name and type of organisation providing education and training	Università di Pisa, Pisa (Italy).
	<b>Conference on Qualitative and Geometric Aspects of Elliptic PDE's</b>
Dates	2 <sup>nd</sup> – 6 <sup>th</sup> September 2013
Name and type of organisation providing education and training	CRM Facultat de Ciències UAB, Barcelona (Spain).
	<b>Eleventh Workshop on Interactions Between Dynamical Systems and Partial Differential Equations</b>
Dates	15 <sup>th</sup> – 19 <sup>th</sup> July 2013
Name and type of organisation providing education and training	School of Mathematics and Statistics of the Universitat Politècnica de Catalunya, Barcelona (Spain).
	<b>Conference on Geometrical Analysis</b>
Dates	1 <sup>st</sup> – 5 <sup>th</sup> July 2013
Name and type of organisation providing education and training	Centre de Recerca Matemàtica, Bellaterra, Barcelona (Spain).
	<b>Advanced Course on Topics in Conformal Geometry and Geometry Analysis</b>
Dates	June 2013
Name and type of organisation providing education and training	CRM Facultat de Ciències UAB, Barcelona (Spain).
	<b>Variational Problems and Geometric PDEs</b>
Dates	June 2013
Name and type of organisation providing education and training	University of Granada, Granada (Spain).
	<b>Conferences “Recent Advances in Nonlinear Partial Differential Equations”</b>
Dates	May 2013
Name and type of organisation providing education and training	Courant Institute, New York (USA).
	<b>Mini Courses on Nonlinear Elliptic Equations</b>
Dates	May 2013
Name and type of organisation providing education and training	Rutgers University, New Jersey (USA).
	<b>10<sup>th</sup> Winter school “Recent Trends in Nonlinear Science”</b>
Dates	February 2013
Name and type of organisation providing education and training	University of Murcia, Murcia (Spain).
	<b>“Workshop on Geometry of Interfaces and Capillarity”</b>
Dates	25 <sup>th</sup> - 27 <sup>th</sup> June 2012

Name and type of organisation providing education and training University of Granada, Granada (Spain)

**“CMC and minimal surfaces” by William H. Meeks III**

Dates 28<sup>th</sup> - 30<sup>th</sup> May 2012

Name and type of organisation providing education and training University of Granada, Granada (Spain)

**Geometry Day (participant)**

Dates 15<sup>th</sup> and 16<sup>th</sup> December 2012

Name and type of organisation providing education and training University of Granada, Granada (Spain).

### Others

**Music and violin studies**

Dates September 1999 – December 2003

Name and type of organisation providing education and training Music School of Montilla, Córdoba (Spain).

Mother tongue **Spanish**

Other language(s)  
(Self-assessment)

	Understanding		Speaking		Writing
	<u>Listening</u>	<u>Reading</u>	<u>Spoken interaction</u>	<u>Spoken production</u>	
<b>English</b>	Advanced	Advanced	Advanced	Advanced	Advanced
<b>Italian</b>	Advanced	Advanced	Advanced	Advanced	Advanced
<b>German</b>	Basic	Intermediate	Basic	Intermediate	Basic



## Curriculum vitae di Francesco Di Plinio

francesco.diplinio@wustl.edu, <https://sites.wustl.edu/francescodiplinio/>

### Punti salienti del Curriculum Vitae

#### CARRIERA ACCADEMICA

- **Assistant Professor (tenure-track)**, Department of Mathematics and Statistics, Washington University in St. Louis, a partire da Luglio 2019. .
- **Assistant Professor (tenure-track)**, Department of Mathematics, University of Virginia, luglio 2016-Luglio 2019
- **Tamarkin Assistant Professor**, Department of Mathematics, Brown University (settembre 2014–giugno 2016)
- **Indam-Cofund Marie Curie Fellow**, Dipartimento di Matematica, Università degli Studi “Tor Vergata”, Roma (dicembre 2012–novembre 2014, dimissioni agosto 2014)
- **Ph.D. in Matematica Pura**, Indiana University Bloomington, dicembre 2012.

#### QUALIFICHE PROFESSIONALI E FINANZIAMENTI ALLA RICERCA (SELEZIONE)

- **National Science Foundation Grant NSF-DMS-1650810**, Principal Investigator, luglio 2015-giugno 2019: \$151,237
- **National Science Foundation Grant NSF-DMS-1800628/2000510**, Principal Investigator, luglio 2018-giugno 2021: \$179,972.
- Abilitazione Scientifica Nazionale, Analisi Matematica, Probabilità e Statistica Matematica (comparto 01/A3), seconda fascia ottenuta a novembre 2014, luglio 2018.

#### PUBBLICAZIONI

- autore di 33 articoli, di cui 28 pubblicati o accettati su riviste internazionali. Selezioni di riviste: IMRN, Annali SNS, Analysis and PDE, Transactions AMS, Journal d'Analyse Math., Indiana University Math. J., J. London Math. Soc., SIAM J. Math. Anal.

#### SELEZIONE DI INVITI PLENARI A CONFERENZE , E ORGANIZZAZIONE DI CONFERENZE.

- **11th International Conference on Harmonic Analysis and Partial Differential Equations**, 8-12 giugno, 2020, El Escorial, Madrid, Spagna (rinviato al 2021)
- **Harmonic analysis and related topics**, conference in honor of Prof. Michael Lacey's 60th birthday. CRM Barcelona, Spain, 25-29 Maggio 2020 (rinviato 2021)
- **Harmonic Analysis and PDE 2019**, conferenza internazionale, 3-7 giugno 2019, Università di Helsinki. Comitato Organizzatore.
- **ICM 2018 Satellite Conference in Harmonic Analysis**, luglio 24-29, 2018, Porto Alegre (Brazil).
- **2nd Northeastern Analysis Meeting (NEAM)**, ottobre 13-15, 2017, Albany, NY, USA.
- **MSRI Workshop on Recent Developments in Harmonic Analysis**, nell'ambito del programma MSRI in Harmonic Analysis, 15-19 Maggio, 2017, Berkeley, CA, USA.
- Seminari dipartimentali ad invito (selezione fra 50+): Yale University, Texas A&M, Brown University, U Wisconsin, Hausdorff Center Bonn, ICMAT Madrid, CRM Barcelona, Georgia Tech, Princeton U, University of Illinois at Urbana-Champaign

## 1. Storia accademica e professionale

### TITOLI DI STUDIO

- Indiana University Bloomington (09/2008–12/2012).  
Ph.D. in Pure Mathematics. GPA: 4.00/4.00  
Tesi:  *$L^p$  bounds for the directional Hilbert transform and endpoint estimates with application to Euler equations*. Advisors Prof. C. Demeter and R. Temam
- Politecnico di Milano (09/2002–07/2007).  
Laurea Magistrale [M.Sc.] in Ingegneria Matematica, Relatore Prof. V. Pata. Voto finale: 110/110 *summa cum laude*.

### POSIZIONI ACCADEMICHE

- **Assistant Professor (tenure-track)**, Department of Mathematics and Statistics, Washington University in St. Louis, a partire da Luglio 2019. Attualmente in corso la procedura di valutazione per promozione a tenured Associate Professor.
- **Assistant Professor (tenure-track)**, Department of Mathematics, University of Virginia, luglio 2016-luglio 2019 (dimissioni consegnate per trasferimento alla Washington University)
- **Tamarkin Assistant Professor**, Department of Mathematics, Brown University (settembre 2014–giugno 2017; dimissioni luglio 2016).
- **Marie Curie Fellow**, Dipartimento di Matematica, Università degli Studi “Tor Vergata”, Roma (dicembre 2012–novembre 2014, dimissioni agosto 2014)

### FINANZIAMENTI ALLA RICERCA E QUALIFICHE

- **Principal investigator (PI), NSF Grant NSF-DMS-1800628/2000510**, titolo “Singular Integrals with Modulation or Rotational Symmetry Conferita il 29 marzo 2018. Durata luglio 2018–giugno 2021: \$179,972.  
Descrizione progetto [this URL or https://www.nsf.gov/](https://www.nsf.gov/)
- **Principal investigator (PI), NSF Grant NSF-DMS-1650810**, titolo “Endpoint Behavior of Modulation Invariant Singular Integrals”, luglio 2015–giugno 2019: \$151,237 (in precedenza NSF-DMS-1500049) Descrizione progetto [this URL or on https://www.nsf.gov/](https://www.nsf.gov/)
- **Co-PI, NSF Includes-WATCHUS subaward**, (con Sara Maloni) 1 ottobre 2017 - 30 settembre 2018, PI: Judy Walker, U Nebraska (award number DMS-1649365) titolo “Diversity and Inclusion in Mathematics at the University of Virginia”, \$5000
- **Co-PI, Arts & Sciences Diversity and Inclusion Grant at UVa**, conferita Spring 2018, (con Sara Maloni) titolo “Women and Diversity in Mathematics, Statistics and Physics”, \$10,000
- Abilitazione Scientifica Nazionale, Analisi Matematica, Probabilità e Statistica Matematica (comparto 01/A3), ottenuta a novembre 2014, luglio 2018.

## 2. Pubblicazioni

Le pubblicazioni sono numerate in ordine crescente per data di completamento ed elencate in ordine cronologico inverso all'interno di ciascun gruppo

### 2.A. LIBRI E DISPENSE

- F. Di Plinio, *A dyadic approach to Lebesgue theory*, libro di testo introduttivo alla Teoria della Misura e all'Analisi Reale Euclidea. 181 pp., 121 esercizi, in corso di ultimazione, preprint disponibile in webpage personale

### 2.B. ARTICOLI PUBBLICATI O ACCETTATI. (28)

- (32) F. Di Plinio, K. Li, H. Martikainen, E. Vuorinen, *Multilinear operator-valued Calderón-Zygmund theory*, **J. Funct. Anal.** **279** (2020), no. 8, numerazione pagine da determinare
- (27) A. Culiuc, F. Di Plinio, M. Lacey and Y. Ou, *Endpoint sparse bounds for Walsh-Fourier multipliers of Marcinkiewicz type*, accettato in **Rev. Mat. Iberoamericana**, preprint [arXiv:1805.06060](https://arxiv.org/abs/1805.06060)
- (23) F. Di Plinio, T. Hytönen and K. Li *Sparse bounds for maximal rough singular integrals via the Fourier transform*, accettata in **Ann. Inst. Fourier**, preprint [arXiv:1706.09064](https://arxiv.org/abs/1706.09064)
- (26) F. Di Plinio, I. Parissis, *On the maximal directional Hilbert transform in three dimensions*, in stampa, **Int. Math. Res. Not. IMRN.**, disponibile online a <https://doi.org/10.1093/imrn/rny138>, preprint [arXiv:1712.02673](https://arxiv.org/abs/1712.02673)
- (25) A. Culiuc, F. Di Plinio, Y. Ou. *A sparse estimate for multisublinear forms involving vector valued maximal functions*, **Bruno Pini Math. Anal. Sem.** (2018), 168–184
- (24) F. Di Plinio, S. Guo, C. Thiele and P. Zorin-Kranich, *Square functions for bi-Lipschitz maps and directional operators*, **J. Funct. Anal.** **275** (2018), no. 8, 2015–2058.
- (22) F. Di Plinio and I. Parissis, *A sharp estimate for the Hilbert transform along higher order lacunary directions*, **Israel J. Math.** **227** (2018), no. 1, 189–214.
- (21) F. Di Plinio, A. Giorgini, V. Pata and R. Temam, *The Navier-Stokes-Voigt Equations with Memory in 3D lacking instantaneous kinematic viscosity*, **J. Nonlinear Sci.** **28** (2018), no. 2, 653–686
- (20) J.M. Conde-Alonso, A. Culiuc, F. Di Plinio and Y. Ou, *A sparse domination principle for rough singular integrals*, **Analysis & PDE** **10** (2017), no. 5, 1255–1284
- (19) Y. Q. Do, F. Di Plinio and G. N. Uraltsev, *Positive sparse domination of variational Carleson operators*, **Annali Scuola Norm. Sup. (Scienze)** **18**, no. 4, 1443–1458.
- (18) A. Culiuc, F. Di Plinio and Y. Ou, *Uniform sparse domination of singular integrals via dyadic shifts*, **Math. Res. Lett.** **25** (2018), no.1, 21–42
- (17) A. Culiuc, F. Di Plinio and Y. Ou, *Domination of multilinear singular integrals by positive sparse forms*, **J. London Math. Soc.** **98** (2018) no. (2) 369–392.
- (16) F. Di Plinio and Y. Ou, *A modulation invariant Carleson embedding theorem outside local  $L^2$* , **J. d'Analyse Mathématique** **135** (2018), no. 2, 675–711.
- (15) F. Di Plinio and Y. Ou, *Banach-valued multilinear singular integrals*, **Indiana Univ. Math. J.** **67** (2018), no. 5, 1711–1763.
- (14) F. Di Plinio and C. Thiele, *Endpoint bounds for the bilinear Hilbert transform*, **Trans. Amer. Math. Soc.** **368** (2016), no. 6, 3931–3972. [MR3453362](https://arxiv.org/abs/1605.03931)
- (13) F. Di Plinio and R. Temam, *Grisvard's shift theorem near  $L^\infty$  and Yudovich theory on polygonal domains*, **SIAM J. Math. Anal.** **47** (2015), no. 1, 159–178. [MR3296605](https://arxiv.org/abs/1505.03931)

- (12) F. Di Plinio and A. K. Lerner, *On weighted norm inequalities for the Carleson and Walsh-Carleson operators*, **J. London Math. Soc.** **90** (2014), no. 3, 654–674 [MR3291794](#)
- (11) F. Di Plinio, *Weak- $L^p$  bounds for the Carleson and Walsh-Carleson operators*, **C. R. Math. Acad. Sci. Paris** **352** (2014), no. 4, 327–331 [MR3186922](#)
- (10) F. Di Plinio, *Lacunary Fourier and Walsh-Fourier series near  $L^1$* , **Collect. Math.** **65** (2014), no. 2, 219–232. [MR3189278](#)
- (9) C. Demeter and F. Di Plinio, *Logarithmic  $L^p$  bounds for maximal directional singular integrals in the plane*, **J. Geom. Anal.** **24** (2014), no. 1, 375–416. [3145928](#)
- (8) C. Demeter and F. Di Plinio, *Endpoint bounds for the Quartile Operator*, **J. Fourier Anal. Appl.** **19** (2013), no. 4, 836–856. [MR3089425](#)
- (7) C. Bardos, F. Di Plinio, R. Temam, *The Euler equations in planar nonsmooth convex domains*, **J. Math. Anal. Appl.** **407** (2013), no. 1, 69–89. [MR3063105](#)
- (6) F. Di Plinio, G. S. Duane, R. Temam, *The 3-dimensional Oscillon Equation*, **Boll. Unione Mat. Ital. Ser. IX** **5** (2012), no. 1, 19–54. [MR29196478](#)
- (5) M. D. Chekroun, F. Di Plinio, N. E. Glatt-Holtz, V. Pata, *Asymptotics of the Coleman-Gurtin model*, **Discrete Contin. Dyn. Syst. Ser. S** **4** (2011), no. 2, 351–369. [MR2746378](#)
- (4) F. Di Plinio, G. S. Duane, R. Temam, *Time-dependent attractor for the oscillon equation*, **Discrete Contin. Dyn. Syst.** **29** (2011), no. 1, 141–167. [MR2725285](#)
- (3) F. Di Plinio, V. Pata, *Robust exponential attractors for the strongly damped wave equation with memory. II*, **Russ. J. Math. Phys.** **16** (2009), 61–73. [MR2486806](#)
- (2) F. Di Plinio, V. Pata, *Robust exponential attractors for the strongly damped wave equation with memory. I*, **Russ. J. Math. Phys.** **15** (2008), 301–315. [MR2448344](#)
- (1) F. Di Plinio, V. Pata, S. Zelik, *On the strongly damped wave equation with memory*, **Indiana Univ. Math. J.** **57** (2008), no. 2, 757–780. [MR2414334](#)

## 2.B. ARTICOLI INVIATI PER LA PUBBLICAZIONE (5)

- (33) F. Di Plinio, K.Li, H. Martikainen, E. Vuorinen, *Banach-valued multilinear singular integrals with modulation invariance*, preprint [arXiv:1909.07236](#), inviato a Int. Math. Res. Notices
- (31) N. Accomazzo, F. Di Plinio and I. Parissis, *Singular integrals along lacunary directions in  $\mathbb{R}^n$* , preprint [arXiv:1907.02387](#), in corso di valutazione, Advances in Mathematics
- (30) F. Di Plinio, K.Li, H. Martikainen, E. Vuorinen, *Multilinear singular integrals on noncommutative  $L^p$ -spaces*, preprint [arXiv:1905.02139](#), inviato a Math. Annalen
- (29) N. Accomazzo, F. Di Plinio, P. Hagelstein, I. Parissis, L. Roncal, *Directional square functions*, under review, J. Math. Pures. Appl., preprint [arXiv:2004.06509](#),
- (28) F. Di Plinio and I. Parissis, *Maximal directional operators along algebraic varieties*, in corso di valutazione, Amer. J. Math., preprint [arXiv:1807.08255](#)

## 2.C. ARTICOLI IN CORSO DI ULTIMAZIONE. (5)

- F. Di Plinio, I. Parissis,  $L^2$  maximal theorems along lines in higher dimension, in ultimazione
- F. Di Plinio, B. Wick, T. Williams, *Wavelet representation of multiparameter singular integrals*, in ultimazione
- F. Di Plinio and I. Parissis *The polygonal Fourier summation problem*, in preparazione
- J.M. Conde-Alonso, F. Di Plinio and I. Parissis, *A metric approach to sparse domination*, in completamento

- F. Di Plinio and I. Parissis, *The lacunary Carleson operator on UMD spaces*, preprint disponibile a richiesta

### 3. Seminari, minicorsi, workshop, soggiorni di ricerca

#### 3.a Conferenze plenarie a invito e Colloquia

- **11th International Conference on Harmonic Analysis and Partial Differential Equations**, 8-12 giugno, 2020, El Escorial, Madrid, Spagna; conferenza plenaria ad invito.
- **Harmonic analysis and related topics**, conference in honor of Prof. Michael Lacey's 60th birthday. CRM Barcelona, Spain, 25-29 Maggio 2020, conferenza plenaria ad invito.
- **Convegno Nazionale di Analisi Armonica**, Bergamo, 27-29 maggio 2019, talk di 50 minuti
- **Texas A&M University**, Colloquium, 10 dicembre, 2018
- **Washington U St. Louis**, Colloquium, 6 dicembre, 2018
- **University of Georgia**, Colloquium, 3 dicembre, 2018
- **ICM 2018 Satellite Conference in Harmonic Analysis**, luglio 24-29, 2018, Porto Alegre (Brazil)
- **The International Workshop on Singular Integral Operators**, Chern Institute of Mathematics, Nankai University, Tianjin 300071, China, 3-6 luglio 2018
- **2nd Northeastern Analysis Meeting (NEAM)**, 13-15 ottobre, 2017, Albany, NY.
- **Workshop "New trends in Harmonic Analysis"**, Politecnico di Torino, 24-25 maggio 2018
- **Workshop "Harmonic Analysis in Winter"**, ICMAT Madrid, 8-12 gennaio 2018, webpage link [here](#)
- **XXXVII Convegno Nazionale di Analisi Armonica**, Bressanone, maggio 23-25, 2017
- **MSRI Workshop** "Recent developments in Harmonic Analysis", Berkeley, CA, maggio 15-19 2017 [workshop page](#)
- **Florida State University**, Colloquium, 22 gennaio 2016
- **University of Cincinnati**, Colloquium, 19 gennaio 2016
- **University of Massachusetts**, Colloquium, 14 dicembre 2015
- **University of Virginia**, Colloquium, 10 dicembre 2015

#### 3.b Talk a invito in special session, seminari ad invito, soggiorni di ricerca

2020

- **Convegno Nazionale di Analisi Armonica**, Bologna (ZOOM conference), 3-5 giugno 2020
- **Università di Pisa**, seminario di Analisi, 3 giugno 2020

2019

- **University of Wisconsin**, 13 novembre. Seminario di Analisi Matematica
- **Harmonic Analysis in non-homogeneous settings and applications**, workshop alla University of Birmingham, 10-13 giugno. Conferenza plenaria a invito.
- **Yale University**, Analysis Seminar, 5 aprile
- **University of British Columbia**, Analysis Seminar, 25 febbraio
- **CalTech**, Analysis Seminar, 21 febbraio

2018

- **Brown University**, Analysis Seminar, 5 novembre



- **Indiana University**, Analysis Seminar, 10 ottobre
- **CUNY Graduate Center**, Analysis Seminar, 7 ottobre
- **Joint meeting of the Italian Mathematical Union, the Italian Society of Industrial and Applied Mathematics and the Polish Mathematical Society**, 24-29 settembre, Wrocław (Poland), invited speaker, special session in Harmonic Analysis
- **Virginia Tech**, Analysis Seminar, 12 settembre
- **University of Basque Country**, Analysis Seminar, 14 giugno
- **Southeastern Analysis Meeting**, 23-25 marzo 2018, Georgia Institute of Technology, Atlanta (USA), special session talk

2017

- **Brown University**, Analysis Seminar, 30 ottobre
- **AIM Workshop** “Sparse domination of Singular Integral operators”, San Jose, CA, 9-13 ottobre [workshop page](#), organizzatore
- **Virginia Commonwealth University**, Analysis, Logic and Set Theory Seminar, 1 settembre
- **University of Bergamo**, Analysis Seminar, 26 giugno
- **Convegno Nazionale di Analisi Armonica**, Bressanone (BZ), 23-25 maggio, talk di 50 minuti
- **University of Wisconsin, Madison**, Analysis Seminar, 4 aprile
- **AMS Central Sectional Meeting, Indiana University Bloomington**, 1-2 aprile, special session on “Harmonic Analysis and Partial Differential Equations”, talk a invito
- **Hausdorff Center for Mathematics**, Bonn, marzo 22-24, 2017, talk a invito e soggiorno di ricerca
- **Minicourse on Sparse Domination of Singular Integral Operators beyond CZ theory**, BCAM Bilbao, 27 febbraio-3 marzo [webpage del corso](#)
- **Universidad de La Rioja**, Spain, Analysis day at Logrono, 23 febbraio, talk a invito
- **Basque Center for Applied Mathematics**, Bilbao, Spain, dal 22 febbraio al 24 aprile visiting fellow
- **University of Alabama Tuscaloosa**, Analysis Seminar, 10 febbraio
- **University of Missouri-Columbia**, Analysis Seminar, 7 febbraio
- **University of Birmingham**, United Kingdom, Analysis Seminar, 31 gennaio
- **University of Bologna**, Analysis Seminar, Italy, 26 gennaio

2016

- **Mittag-Leffler Institute**, workshop “Probabilistic Harmonic Analysis and Spectral Theory” Stockholm, Sweden, 11-15 luglio, seminario ad invito
- **10th El Escorial Conference on Harmonic Analysis and PDEs**, Madrid, Spain, 12-16 giugno talk selezionato
- **Universitat Autònoma de Barcelona**, Analysis seminar, 9 maggio
- **Centre de Recerca Matemàtica**, Workshop on function spaces and high-dimensional approximation, 3-11 maggio
- **AMS Southeastern Sectional Meeting**, 5-6 marzo, University of Georgia, Athens, GA, special session on “Sharp estimates and Bellman functions in Harmonic Analysis”, talk a invito

2015

- **Indiana University**, Analysis seminar, 21-24 settembre
- **ICMAT Madrid**, Analysis and Applications seminar, 1-4 settembre (soggiorno di ricerca)
- **Politecnico di Milano**, Analysis Seminar, 14-19 giugno (talk e soggiorno di ricerca)
- **Joint AMS-EMS-PMS meeting**, Special session in “Geometric Aspects of Harmonic Analysis”, Porto (Portugal), 10-13 giugno (talk a invito)
- **AIM Workshop** on Carleson’s theorem and multilinear operators, San Jose (CA) 17-22 maggio
- **University of Virginia**, Analysis Seminar, 26 aprile
- **Yale University**, Applied Mathematics Seminar, 10 febbraio

2014

- **Boston University**, Partial Differential Equations seminar, ottobre 15, 2014
- **Oberwolfach Workshop 1430** on Real Analysis, Harmonic Analysis and Applications, luglio 20-26, 2014
- **10th AIMS Conference** on Dynamical Systems, Differential Equations and Applications, luglio 7-11, 2014, Madrid, Spain. Special session on “Nonlinear Evolution PDEs and Interfaces in Applied Sciences”, talk a invito
- **Hausdorff Institute for Mathematics**, Bonn, Harmonic Analysis and PDE 2014 trimester program. Research stays: maggio 11-18, giugno 16-17 (trimester seminar talk), luglio 13-20

2013

- **Hausdorff Center for Mathematics**, Bonn, novembre 30-dicembre 4, 2013 talk a invito and soggiorno di ricerca
- **SIAM Conference** on Analysis of Partial Differential Equations, dicembre 7-10, 2013, Orlando (FL), United States. Special session MS20, Analysis of Navier-Stokes Equations and Related Fluid Models, talk a invito.
- **Joint Meeting of the AMS and the Romanian Mathematical Society**, giugno 27 - 30, 2013, Alba Iulia, Romania. Special session on Harmonic Analysis and Applications, talk a invito
- **XXXIII Convegno Nazionale di Analisi Armonica**, Alba, giugno 17-20, 2013, talk a invito
- **Harmonic Analysis, PDEs and Geometry at ICMAT**, Workshop, Madrid, maggio 27th-31st, 2013, talk selezionato
- **Hausdorff Center for Mathematics**, Bonn, Oberanalysis seminar, maggio 1-5, talk a invito e soggiorno di ricerca
- **Indiana University**, Institute for Scientific Computing and Applied Mathematics, Bloomington IN, USA, April 5-16, 2013 (soggiorno di ricerca)
- **Brown University**, Analysis and Partial Differential Equations Seminar, Providence RI, USA, April 3, 2013, talk a invito
- **Princeton University**, Analysis and Partial Differential Equations Seminar, USA, April 1, 2013, talk a invito

2009-2012

- **University of Illinois at Urbana-Champaign**, Dynamical Systems and Ergodic Theory Seminar, ottobre 22, 2012, talk a invito

- **9th AIMS Conference** on Dynamical Systems, Differential Equations and Applications, Orlando, FL, USA luglio 1-5, 2012. Talk a invito: special sessions  
#63 Infinite Dimensional Dynamics and Applications (organizzatori J. C. Robinson, Y. You),  
#77 The Navier-Stokes Equations and Related Problems (organizzatori S. Necasova, R. Rautmann, W. Varnhorn).
- **9th El Escorial Conference on Harmonic Analysis and PDEs**, Madrid, Spain, giugno 11-15, 2012, talk selezionato
- **Southeastern Analysis Meeting**, marzo 8-10, 2012, University of Alabama, Tuscaloosa, AL, USA.
- **University of Toledo**, OH, USA, Dynamical Systems Seminar, novembre 15, 2011, talk a invito
- **AMS 2011 Spring Southeastern Section Meeting**, Statesboro, GA, marzo 12-13, 2011. Special Session on Harmonic Analysis and Applications (organizzatori D. Bilyk, L. De Carli, A. Stokolos, B. Wick), talk a invito
- **Conference on Nonlinear Evolution Equations** Mondello, Palermo (Italy), giugno 8-11, 2010 (organizzatori G. Grillo et al.), talk a invito
- **Conference on Mathematical Models and Analytical Problems for Special Materials**, luglio 9-11, 2009 (organizzatori P. Colli, C. Giorgi, M. Grasselli et al.), talk a invito

#### 4. Servizio dipartimentale e professionale

##### ORGANIZZAZIONE DI CONFERENZE

- **ShowMe seminar**, University of Missouri - Columbia and Washington U St. Louis, (in progress, target Spring 2021)
- **Harmonic analysis and PDE**, Helsinki, 3-7 giugno 2019, [pagina web](#)
- **Women's intellectual research network and symposium**, University of Virginia, Charlottesville VA, settembre 15, 2018. Funded by the College of Arts and Sciences at UVa, the NSF and the Mathematics Institute at University of Virginia.
- **American Institute of Mathematics** workshop "Sparse domination of Singular Integral operators", San Jose, CA, ottobre 9-13 2017, [workshop page](#), organizzatore con A. Culiuc, Y. Ou.
- **10th AIMS Conference** on Dynamical Systems, Differential Equations and Applications, luglio 7-11, 2014, Madrid, Spain. Special session on "Harmonic Analysis tools in Fluid Mechanics", organizzatore con R. Temam e D. Wirosoetisno

##### ATTIVITÀ SEMINARIALE, DIPARTIMENTALE E DI DIVULGAZIONE

- **Math Alliance**, mentor, a partire dal Fall 2018 (attività di tutoraggio per studenti in Matematica provenienti da gruppi etnici e sociali sottorappresentati)
- **University of Virginia**, Commissione di selezione postdoc, Anno Accademico 2017-18
- **University of Virginia**, advisor per il distaccamento locale della Association for Women in Mathematics, 2017-oggi
- **University of Virginia** Learning Analysis seminar, co-organizzatore, Fall Semester 2016
- **University of Virginia** Analysis seminar, co-organizzatore, Anno Accademico 2016-17, 2017-18, 2018-19



- **Brown University** organizzatore di un seminario di ricerca in Analisi Armonica per studenti di laurea e dottorato, Anni Accademici 2014-15, 2015-16
- **Brown University** Analysis seminar, co-organizzatore, Anni Accademici 2014-15, 2015-16
- **Indiana University** Graduate Student seminar] organizzatore (Fall 2010-2012)

#### ATTIVITÀ EDITORIALE E PROFESSIONALE

- Referee (selezione):
  - **2020:** JFAA, Math. Annalen, Studia Math. Journal of Geometric Analysis, New York J. Math., Indiana U Math Evol. Eq. Control Th., Math. Z.
  - **2019:** Indiana Univ Math J, Journal d'Analyse, Proceedings AMS, J. Eur Math. Soc.
  - **2018:** Adv. Math., Proceedings LMS, Math. Annalen, Analysis and PDE
  - **2017:** Adv. Math., Journal d'Analyse, Transactions AMS, Indiana Univ. Math. J., Mathe-matika, Michigan Math. J.
  - **2016:** International Math. Res. Notices (IMRN), Analysis and PDE, Rev. Mat. Iberoamer-icana, Proceedings AMS, American J. of Math., J. European Math. Soc.
  - **2015:** J. European Math. Soc., Revista Matematica Iberoamericana, American J. of Math. (2), J. Geometric Analysis, Indiana Univ. Math. J., Boundary Value Problems, Monatshefte Math.
  - **2008-14:** Indiana Univ. Math. J, J. London Math. Soc., Asymptotic Analysis (2), J. of Differential Equations (3), Discrete and Continuous Dynamical Systems (2), Nonlinear Analysis (2)
- NSF Panelist, 2017.

### 5. Insegnamento, advising, mentoring

CORSI TENUTI COME DOCENTE PRINCIPALE (16 corsi semestrali, di cui 3 di dottorato)

- **Spring 2020, Washington U St Louis** MATH 4121 - Introduzione all'integrale di Lebesgue
- circa 25 studenti.
- **Fall 2019, Washington U St Louis** MATH 132 - Calculus 2, due sezioni, circa 300 studenti totali
- **Spring 2019, University of Virginia** MATH 4250 - Differential equations and dynamical systems (eq. differenziali e sistemi dinamici)
- **Fall 2018, University of Virginia** MATH 8250 - Partial Differential Equations (corso dot-torato)
- **Spring 2018, University of Virginia** MATH 7310 - Real analysis and linear spaces I (corso dottorato)
- **Spring 2018, University of Virginia** MATH 4720 - Introduction to Differential Geometry
- **Fall 2017, University of Virginia** MATH 4220 - Partial Differential Equations and Applied Mathematics.
- **Fall 2016, University of Virginia** MATH 3310 - Basic Real Analysis
- **Fall 2016, University of Virginia** MATH 1320 - Calculus II
- **Spring 2016, Brown University** MA 0200 - Intermediate Calculus (2 sezioni) - coordinatore di corso (3 sezioni)
- **Fall 2015, Brown University** MA 2210 - Real Function Theory (corso di dottorato)
- **Spring 2015, Brown University** MA 0540 - Honors Linear Algebra

- **Fall 2014, Brown University** MA 0170 - Advanced placement Calculus
- **Fall 2014, Brown University** MA 1610 - Probability
- **Fall 2012, Indiana University** M119-Brief Survey of Calculus 1 (large section)

#### CORSI TENUTI COME ESERCITATORE

- **Summer 2012, Indiana University** Preparazione per i PhD Qualifying exams - Analysis
- **Spring 2012, Indiana University** Graduate Real Analysis 2 - M512
- **Fall 2011, Indiana University** Honors Calculus 3 - S311 and Calculus 2 - M212; Gre Math Preparation - S499
- **Summer 2010, Indiana University** Preparazione per PhD Qualifying exams - Analysis
- **Fall 2010, Indiana University** Dynamical System and Ergodic Theory - M557 e Linear Algebra - M303
- **Anno Accademico 2007-08, Politecnico di Milano** Analisi Matematica 1 e 2 (Prof. Colombo) e Sistemi Dinamici (prof. Grasselli)

#### ADVISING, COMMISSIONI DI DOTTORATO

- **Washington University in St. Louis** Tyler Williams, studente di PhD in cotutela con Brett Wick (data prevista di fine corso 05/2022; Anastasios Fragkos, studente di PhD, data prevista di fine corso 05/2024).
- **Washington University in St. Louis** Cody Stockdale, PhD Maggio 2020, advisor Brett Wick.
- **University of Helsinki** Emil J. Vuorinen, revisore esterno per la tesi PhD (advisors T. Hytönen and H. Martikainen), defense maggio 2017.
- **Brown University** Amalia V. Culiuc, membro commissione di PhD (chair: Sergei Treil), Spring 2016
- **Brown University** Max Moltipz, relatore di una Undergraduate Honors thesis supervision, Spring 2016

## 6. Attività varie e premi

#### ALTRI CORSI ED ATTIVITÀ

- Workshop for Women in Analysis and PDE, Institute for Mathematics and its Applications, University of Minnesota, 30 maggio-2 giugno 2012.
- NSF - UCLA Summer School on Geometric and Fourier analytic questions in Euclidean space, settembre 10-settembre 15, 2011 (organizzatore: C. Thiele)
- NSF - UCLA Summer/Fall School on Weighted Estimates for Singular Integrals, ottobre 03-ottobre 08, 2010 (organizzatore: C. Thiele)
- SMI Summer School in Mathematics, agosto 2007. Corsi seguiti: Functional Analysis (R. Laugesen, University of Illinois; voto finale 30/30 *cum laude*), Differential equations (A. Visintin, Università di Trento; voto finale 30/30).
- International Mathematics Olympiads, finalista nazionale 2002.

#### PREMI

- J. and F. M. Swain Fellowship, Indiana University, per la migliore attività di ricerca di dottorato Anno Accademico 2011-2012

- Robert E. Weber Memorial Award, Indiana University, migliori Qualifying exams, Spring 2009
- Fondazione Fratelli Confalonieri Milano Master Thesis Award and Fellowship, EUR 6000, Anno Accademico 2007-2008

## 7. Referenze professionali

Ciprian Demeter  
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 831 E 3rd St, Bloomington IN 47405, United States  
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# Curriculum Vitae

ROBERTO FEOLA

July 13th, 2020

## EDUCATION.

1. **July 2009:** University of “Roma Tre”: Bachelor degree in Mathematics. Final mark: 110/110 *cum laude*. Date: 09/07/2009.
2. **May 2012:** University of “Roma Tre”: Master degree in Mathematics. Title of the thesis: “Resonant tori and one-dimensional systems with quasi-periodic forcing”. Advisor: Prof. G. Gentile. Final mark: 110/110 *cum laude*. Date: 17/05/2012.
3. **February 2016:** PHD at University of Roma “La Sapienza”: Advisor: M. Procesi Title of the thesis: “Quasi-periodic solutions for fully nonlinear NLS”. Date: 23/02/2016

## POSITIONS.

1. **November 2015/ October 2018:** Post-DOC at SISSA - Trieste.
2. **Current:** November 2018-present, two years Post-DOC at the “Laboratoire de Mathématiques Jean Leray, Université de Nantes.

## QUALIFICATIONS.

Holder of “Qualification a Maître de Conférence” , effective from January 1, 2020 to December 31, 2024.

**Research Interests:** Differential equations and dynamical systems, small divisor problems, periodic and quasi-periodic solutions, Hamiltonian Pde’s, KAM Theory, Nash-Moser Implicit Function Theorem. Para-differential calculus.

## PUBLICATIONS.

1. **L. Corsi, R. Feola, G. Gentile**  
*Lower-dimensional invariant tori for perturbations of a class of non-convex Hamiltonian functions,*  
Journal of Statistical Physics 150(1) : 156-180 (2013).  
DOI: 10.1007/s10955-012-0682-8
2. **L. Corsi, R. Feola, G. Gentile**  
*Domains of analyticity for response solutions in strongly dissipative forced systems,*  
Journal of Mathematical Physics 54, 122701 (2013).  
DOI: 10.1063/1.4836777

3. **L. Corsi, R. Feola, G. Gentile**  
*Convergent series for quasi-periodically forced strongly dissipative systems,*  
 Communications in Contemporary Mathematics 16(3), 1350022 (2014).  
 DOI: 10.1142/S0219199713500223
4. **R. Feola, M. Procesi**  
*Quasi-periodic solutions for fully nonlinear forced reversible Schrödinger equations,*  
 Journal of Differential equations, 259(7) : 3389–3447 (2015),  
 DOI: 10.1016/j.jde.2015.04.025
5. **L. Corsi, R. Feola, M. Procesi**  
*Finite dimensional invariant KAM tori for tame vector fields,*  
 Transactions of the Amer. Math. Soc. 372 : 1913–1983 (2019),  
 DOI: <https://doi.org/10.1090/tran/7699>
6. **R. Feola, F. Iandoli**  
*Local well-posedness for quasi-linear NLS with large Cauchy data on the circle,*  
 Annales de l'Institut Henri Poincaré C, Analyse non linéaire, 36(1) : 119–164 (2019),  
 DOI: 10.1016/j.anihpc.2018.04.003
7. **R. Feola, F. Giuliani, S. Pasquali**  
*On the integrability of Degasperis-Procesi equation: Birkhoff resonances and strong stability,*  
 Journal of differential Equations, 266(6) : 3390–3437 (2018),  
 DOI: 10.1016/j.jde.2018.09.003
8. **R. Feola, F. Giuliani, M. Procesi**  
*Reducibility for a class of weakly dispersive linear operators arising from the Degasperis Procesi equation,*  
 Dynamics of partial differential equations, 16(1) : 25–94 (2019),  
 DOI: 10.4310/DPDE.2019.v16.n1.a2
9. **R. Feola, F. Giuliani, R. Montalto, M. Procesi**  
*Reducibility of first order linear operators on tori via Moser's theorem,*  
 Journal of Functional Analysis, 276(3) : 932–970 (2019),  
 DOI: 10.1016/j.jfa.2018.10.009
10. **R. Feola, F. Iandoli**  
*Long time existence for quasi-linear NLS with small Cauchy data on the circle,*  
 Annali della Scuola normale superiore di Pisa, Classe di scienze (2019),  
 DOI: 10.2422/2036-2145.201811\_003, arXiv:1806.03437
11. **R. Feola, B. Grebért**  
*Reducibility of Schrödinger equation on the Sphere,*  
 International Mathematics Research Notices (2020, published online),  
 DOI: <https://doi.org/10.1093/imrn/rnz344>, arXiv: 1905.11964

12. **M. Berti, R. Feola, F. Pusateri**  
*Birkhoff normal form for Gravity Water Waves*,  
 Water Waves (2020, published online),  
 DOI: 10.1007/s42286-020-00024-y
13. **M. Berti, R. Feola, L. Franzoi**  
*Quadratic life span of periodic gravity-capillary water waves*,  
 Water Waves (2020, published online),  
 DOI: <https://doi.org/10.1007/s42286-020-00036-8>
14. **R. Feola, F. Giuliani, M. Procesi**  
*Reducible KAM tori for Degasperis-Procesi equation*,  
 Comm. Math. Phys. 377, 1681-1759(2020),  
 DOI: <https://doi.org/10.1007/s00220-020-03788-z>
15. **R. Feola, B. Grebért, T. Nguyen**  
*Reducibility of Schrödinger equation on a Zoll manifold with unbounded potential*.  
 Journal of Mathematical Physics (2020, published online)  
 DOI: 10.1063/5.0006536

PREPRINTS.

16. **R. Feola, M. Procesi**  
*KAM for quasi-linear autonomous NLS*.  
 preprint arXiv:1705.07287
17. **M. Berti, R. Feola, F. Pusateri**  
*Birkhoff normal form and long time existence for pure gravity water waves in infinite depth*.  
 preprint arXiv:1810.11549
18. **R. Feola, F. Iandoli**  
*A non-linear Egorov theorem and Poincaré-Birkhoff normal forms for quasi-linear Pdes on the circle*.  
 preprint arXiv:2002.12448.
19. **R. Feola, F. Iandoli**  
*Local well-posedness for the quasi-linear Hamiltonian Schrödinger equation on tori*.  
 preprint arXiv:2003.04815.
20. **R. Feola, F. Giuliani**  
*Quasi-periodic traveling waves on an infinitely deep fluid under gravity*.  
 preprint arXiv:2005.08280.

WORK IN PROGRESS.

21. **R. Feola, F. Iandoli**  
*Long time solutions for quasi-linear Hamiltonian Schrödinger equations on Tori*.



## 22. R. Feola, B. Grébert, F. Iandoli

*Long time existence for quasi-linear wave equation on tori.*

### RESEARCH ACTIVITIES.

*Dynamical systems:* During and immediately after my undergraduate thesis I studied KAM theory for finite dimensional systems. In particular in my thesis I recovered the controversial paper by Cheng on the existence of degenerate lower dimensional tori - of codimension 1- adapting his proof to the isochronous case. Later in [1], together with my advisors, we covered the new case when the unperturbed Hamiltonian is non-convex. This is one of the very few results on the existence degenerate lower dimensional tori. In [2] and [3] we studied 1-dimensional mechanical systems in the presence of large dissipation and a quasi-periodic forcing. We proved the existence of quasi-periodic response solutions for degenerate forcing, with very mild conditions on the frequency.

*KAM theory, quasi-linear PDEs:* In my PhD thesis I proved the existence of quasi periodic solutions for some quasi-linear PDEs. In [4] I consider a forced Schrödinger equation with unbounded non linearity. The strategy of the proofs are based on a combination of a Nash-Moser Implicit function theorem (to overcome the issue of small divisors) and reducibility of unbounded, non constant coefficients operators. Pseudo-differential calculus play a fundamental role in the latter argument. This strategy was first developed by Baldi-Berti-Monalto for the Airy equation. The novelty of my work with respect to their paper, was to deal with a non-scalar equation with double eigenvalues. In [5] we proved an abstract theorem for the construction of invariant tori for “tame” vector field, in particular considering the analytic case. In [15] we applied this strategy to the fully-nonlinear NLS, proving the existence of analytic quasi-periodic solutions. Later considered a perturbation of the Degasperis-Procesi equation (a model for non linear shallow water dynamics), which is an equation known for having a very complicated behavior; see below. In particular in spite of the fact that the (unperturbed) DP is a widely studied integrable PDE, ours is the first result (see [14]) on the existence of quasi-periodic solutions. The ideas developed in [14], in particular concerning *nonlinear bifurcation* analysis, led to [20] where we proved the existence of quasi-periodic traveling waves for the gravity water waves. This model is *completely resonant* and the existence of *periodic* solutions have been widely studied. Our result [20] required a refined bifurcation analysis where we exploit approximate the integrability of the system to deal with non-trivial four-waves interactions.

*Reducibility:* The general problem of reducibility for linear differential systems with time quasi-periodic coefficients is to prove that they can be conjugated, using “regular” and quasi-periodic changes of coordinates, to some autonomous system for most values of the frequency vector. In particular I studied the reducibility problem in an infinite-dimensional context for “weakly” dispersive linear operators arising from the Degasperis-Procesi equation ([8]). Then, I studied the reducibility of first order linear operators on tori of arbitrary dimension ([9]) and linear, unbounded, Schrödinger operators on Zoll manifolds ([11],[15]). These are some of the very few results on reducibility for systems in dimension higher than 1. One of the main features is the use of pseudo-differential calculus, currently believed to be a fundamental ingredient that needs development in order to tackle higher dimensional problems. These higher dimensional reducibility results are part of a project whose aim is to provide existence of quasi-periodic solutions for *non-linear* PDEs with unbounded nonlinearities on general

compact manifolds. In particular to develop KAM theory for PDEs on Zoll is still an open problem even for *semilinear* equations.

*Integrable PDEs:* I mainly concentrated on the DP equation. It is known that, for some regimes, the infinitely many constants of motions, do not control the Sobolev norms, not even the  $H^1$ -norm. Moreover the resonances have a very complicated structure so in principle the Birkhoff Normal Form might not depend only on the actions. However, in most regimes, I showed that the constants of motions indeed control Sobolev norms of the solutions near the origin. Moreover I showed that the solutions, evolving from small initial data, are defined globally in time. I also studied the algebraic properties of the constants of motions proving that the formal Birkhoff normal form of the Degasperis-Procesi at any order is action-preserving.

*Well-posedness, energy method, Birkhoff normal form:* I considered the Cauchy problem associated to some quasi-linear PDEs with the aim of proving existence of solutions (in Sobolev spaces) evolving from both small and large initial data. I mostly worked on models of quasi-linear Schrödinger equations arising from many domains on physics like plasma physics, quantum mechanics, condensed matter theory. I also considered models of fluid mechanics like the water waves equations. The well-posedness problem of these type of equations posed on the *Euclidean space* received the attention of many mathematicians. Very little is known for equations on compact manifolds where the problem of *global existence/blow up* is completely open and where even to obtain a local in time well-posedness is a challenging problem. With the aim of studying the long time behavior for quasi-linear equations on tori, I started by proving the local in time well-posedness for quasi-linear Schrödinger equations on the circle ([6]). This result has been recently extended to any dimension in [19] providing the first result of this type on compact manifolds. The proof of the aforementioned results is based on the following key ideas: (i) a parilinearization *a la* Bony which rewrite the equation as a paradifferential system; (ii) a quasi-linear iterative scheme to find a sequence of approximate solutions; (iii) various reductions to constant coefficient operators/ block-diagonalization through flow conjugation techniques to obtain *a priori* energy estimates on each approximate problem. The study of the long time behavior requires additional ideas. Indeed, on compact manifolds, there are no obvious dispersive effects that help to control solutions for long times. In addition, the quasilinear nature of the equations and the lack of conserved quantities which control high Sobolev norms, prevent the effective use of semilinear techniques. Starting from the new paradigm introduced by Berti-Delort I studied the long time stability for the 1-d Schrödinger, firstly in [10], and later in [18] where we provide a systematic way to obtain a normal form result for quasi-linear PDEs by fully exploit the Hamiltonian structure without any algebraic restrictions on the initial data. For instance in [10] the result holds only for *even* in space initial conditions. I also obtained long time existence results for the 1-d gravity-capillary water waves ([13]) and for the pure gravity water waves ([12], [16]). In particular [16] provide the proof of an long standing conjecture regarding the integrability at order four of gravity water waves in infinite depth. In the early 90s Zakharov and Dyachenko conjectured the integrability of the water waves system by showing suitable cancellations on the coefficients of the resonant interactions at order four. Later on Craig and Worfolk confirmed this sort of “integrability” of the normal form at order four but also proved that such cancellations do not appear for non trivial five-waves resonant interactions. These papers are *formal* in the sense that no actual relation can be established between the flow of the water waves with the flow of the Birkhoff normal form Hamiltonian.

In [16] we provided suitable bounds in Sobolev spaces on the Birkhoff maps and we obtained *rigorous* energy estimates on the flow of the water waves system. This has been achieved by using modern techniques of paradifferential calculus and a novel normal form identification argument that allowed us to handle Benajamin-Feir resonances by comparing with the formal computations of Zakharov and Dyachenko.

#### TEACHING.

1. **A.A. 2008-09:** Tutor for the course “Differential Equations and Mechanics” (Prof. G. Gentile), at the Mathematics department, University of “Roma Tre”.
2. **A.A. 2009-10:** Tutor for the course “Differential Equations and Mechanics” (Prof. G. Gentile), at the Mathematics department, University of “Roma Tre”.
3. **A.A. 2010-11:** Tutor for the courses “Differential Equations and Mechanics” (Prof. G. Gentile) and “Preparation for the Final Exam” (Prof. G. Gentile and Prof. A. Bruno), at the Mathematics department, University of “Roma Tre”.
4. **A.A. 2011-12:** Tutor for the course “Differential Equations and Mechanics” (Prof. A. Giuliani), at the Mathematics department, University of “Roma Tre”.
5. **A.A. 2013/2014:** Assistant for the course “Partial Differential Equations” (Prof. A. Pellegrinotti), at the Mathematics department, University of “Roma Tre”.
6. **A.A. 2014/2015:** Assistant for the course “Istituzioni di Analisi Superiore” (Prof. U. Bessi), at the Mathematics department, University of “Roma Tre”.

#### STUDENTS MENTORED.

1. **2015/2016** Alice Ambrosio (PhD).
2. **2016/2017** Filippo Giuliani (PhD).
3. **2018/2019** Trung Nguyen (PhD)

#### SUPERVISOR.

1. **2017/2018** PhD advisor for Felice Iandoli, with Prof. M. Berti.  
Title of the thesis: “*Local and almost global solutions for fully-nonlinear Schrödinger equations on the circle*”.

#### CONFERENCES AS INVITED SPEAKER.

1. **September 2013:** conference “Multiscale Methods in small divisors problem” Maiori. Talk: “Quasi-Periodic Solutions for quasi-linear forced NLS”;
2. **September 2014:** conference “KAM Theory and Dispersive PDE’s” in Rome; talk about “Quasi-Periodic solutions for quasilinear forced NLS”;
3. **December 2014:** Workshop “Metodi KAM e dispersivi in PDE Hamiltoniane” Milano. Talk: “Quasi-Periodic Solutions for quasi-linear forced NLS.”

4. **September 2015:** Convegno UMI Siena 7-12 Sept. 2015. Talk: “KAM Theory for quasi-linear PDE’s ”.
5. **June 2019:** seminar at “Hamiltonian PDEs: KAM, Reducibility, Normal Forms and Applications” - Oaxaca 2019: “ Birkhoff normal form for periodic water waves”;
6. **September 2019:** conference ”New trends in propagation of linear and nonlinear wave phenomena”, Erice 2019. Talk: “Reducible KAM tori for Degasperis-Procesi equation”.

#### FORTHCOMING CONFERENCES.

1. **November 2020:** invited speaker to “Ypatia Conference 2020” in Rome.

#### INVITED SPEAKER.

1. **November 2015:** seminar at SISSA. Title: “Quasi-periodic solutions for fully non-linear NLS”.
2. **November 2016:** invited speaker to Nantes by Prof. Benoit Grèbert. Talk: “KAM theory for quasi-linear NLS”;
3. **March 2017:** invited speaker to RomaTre by Prof. Michela Procesi. Talk about almost global existence for quasi-linear NLS on the circle;
4. **December 2017:** invited speaker to Naples by Prof. Pietro Baldi. Talk: “ Local well-posedness for quasi-linear NLS with large Cauchy data on the circle”;
5. **June 2018:** seminar at SISSA. Title: “On the Cauchy problem for a class of fully nonlinear Schrödinger equation”.
6. **July 2018:** invited speaker to RomaTre by Prof. Michela Procesi. Talk about long time existence for periodic gravity water waves;
7. **September 2018:** seminar at “XLIII Summer School On Mathematical Physics - Ravello 2018: “BNF for Water waves”;
8. **November 2018:** seminar at “University of Nantes”: Birkhoff normal form and long time existence for periodic gravity water waves;
9. **February 2019:** invited speaker at “Universitat Politècnica de Catalunya” by Prof. M. Guardia. Title: “Birkhoff Normal Form and long time existence for periodic gravity water waves”.
10. **July 2019:** invited speaker at “University of Toronto” by Prof. Fabio Pusateri. Title: “Reducible KAM tori for Degasperis-Procesi equation”;
11. **October 2019:** invited speaker at “University Paris13”-LAGA by Prof. Jean-Marc Delort. Title: “Birkhoff normal form for periodic water waves”;
12. **March 2020:** invited speaker for the series of seminars “Enrique-Lebesgue”, University of Nantes/University of Milano. Title: “A non-linear Egorov Theorem and Poincaré-Birkhoff Normal forms for quasi-linear PDEs on the circle”.

#### ATTENDED CONFERENCES.

1. **September 2012:** conference “PDE’s in Rome: School and Conference” in Rome;
2. **February 2013:** winter School: “Dynamics and Pde’s” in Saint-Etienne de Tinnée
3. **June 2013:** HANDDY Conference: “Hamiltonians and Dispersive Equations: Dynamics”, CIRM-Marseille;
4. **January 2014:** conference in Toronto “Hamiltonian PDEs: Analysis Computations and Applications”;
5. **February 2014:** Winter school: Dynamics and PDEs, Saint- Etienne de Tinée;
6. **June 2014:** Workshop on interactions between Dynamical Systems and Partial Differential Equations in Barcellona;
7. **November 2014:** Workshop DYNPDE, Dynamics and PDE’s Cargese.
8. **July 2015:** Summer school “Normal forms and large time behavior for nonlinear PDE”, Nantes.
9. **July 2016:** summer schools “Nonlinear Waves 2016” in Paris ;
10. **September 2016:** conference “Hamiltonian Dynamics, PDEs and Waves on the Amalfi coast”;
11. **February 2017:** winter school “Dynamics and PDEs” in Saint-Etienne de Tinnée, France;
12. **May 2018:** School and Conference on Nonlinear Waves in Atlanta (US);
13. **July 2018:** EMS Lectures Summer School, Roma “Tor Vergata”;
14. **September 2018:** XLIII Summer School On Mathematical Physics in Ravello ;
15. **May 2019:** “Leaning tori” An Hamiltonian Event under the Tower, Pisa Centro “De Giorgi”;

#### RESEARCH MEETINGS.

1. **April 2013:** “Growth of Sobolev norms for NLS”, speaker: E. Haus.
2. **July 2013:** “An Abstract Nash-Moser theorem with applications to existence of quasi-periodic solutions for PDEs on compact homogeneous manifolds”, speaker: L. Corsi.
3. **February 2014:** “Nearly integrable systems with orbits accumulating to KAM tori”, speaker M. Guardia.
4. **June 2014:** “Energy cascades and wave turbulence for the cubic Schrödinger equation”, speaker Z. Hani.

5. **December 2015:** Mini Course: “Arnol’d Diffusion via Invariant Cylinders and Mather Variational Methods” speaker V. Kaloshin.
6. **April 2015:** Mini-course on “Weak Turbulence” by dott. A. Maiocchi.
7. **October 2015:** research meeting on “KAM for quasi-linear PDEs” with M. Procesi and D. Bambusi.
8. **November 2019:** scientific collaboration with dott. F. Giuliani and Prof. M. Guardia at “UPC” Barcelona.

#### LONG STUDY PERIODS.

1. **February 2015:** Invitation at the “Mc Master University” Hamilton, Canada 1-25 February 2015 Seminar: “Quasi-periodic solutions for fully non-linear NLS”, 13 Feb. 2015 Mc Master University, 23 Feb. 2015 University of Toronto. Scientific collaboration with Prof. W. Craig and Dott. L. Corsi.
2. **July 2019:** scientific collaboration with Prof. Fabio Pusateri. Seminar: “Reducible KAM tori for Degasperis-Procesi equation” at University of Toronto.

#### MEMBER OF THE ORGANIZING COMMITTEE.

1. “Roman Summer school and workshop: KAM theory and dispersive PDEs” (together with L. Biasco, P. Magrone, M. Procesi, L. Corsi, E. Haus),  
<http://ricerca.mat.uniroma3.it/users/procesi/RomanPDEs2014.html>  
Roma 1-11 Sept. 2014
2. Hamiltonian dynamics, PDEs and Waves on the Amalfi coast (together with M. Procesi, P. Baldi, E. Haus, A. Maspero, V. Coti Zelati, L. Biasco),  
<http://ricerca.mat.uniroma3.it/users/procesi/maiori2016/home.html>  
Maiori, 5-10 Sept. 2016.

#### MEMBER OF RESEARCH PROJECTS.

1. Member of the ERC project: “Hamiltonian PDEs and small divisor problems: a dynamical system approach” n. 306414 under FP7. (Principal investigator M. Procesi)
2. Member of Miur-PRIN 2012 “Aspetti variazionali e perturbativi nei problemi differenziali nonlineari ” n. 201274FYK7\_004.
3. Member of Miur-PRIN 2015 “Variational methods, with applications to problems in mathematical physics and geometry” n. 2015KB9WPT-008.
4. Member of the ERC Project “FAnFARe” n. 637510. (Principal investigator Frederic Bernicot)

5. Supported by the Centre Henri Lebesgue ANR-11-LABX- 0020-01.
6. Member of the project ANR -15-CE40-0001-02 “BEKAM” of the Agence Nationale de la Recherche.

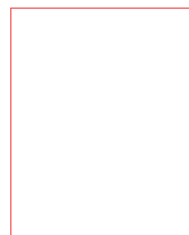
VARIA.

1. 2012 First certificate at British Council

LANGUAGES SKILLS.

1. Italian: mother language
2. English: Upper intermediate (written and spoken)
3. French: Basic knowledge

DARIA GHILLI



### Current position

**July 2019-October 2020:** Research Grant at the Department of Mathematics "Tullio Levi-Civita" of the University of Padua (Italy).

**Project:** Nonlinear partial differential equations: asymptotic problems and mean-field games.

### PostDoc

**March 2016-May 2019:** Post-doc at the Institute of Mathematics and Scientific Computing, University of Graz, (Austria).

**Project:** ERC Advanced Grant Project OCLOC- from Open to Closed Loop Optimal Control.

**Supervisor:** Prof. Karl Kunisch.

### PhD

**January 2013-February 2016:** Department of Mathematics "Tullio Levi-Civita", University of Padua (Italy).

**24/02/2016:** Thesis defence, mention "excellent".

**Supervisor:** Prof. Martino Bardi.

**Title of the thesis:** *Some results in nonlinear PDEs: large deviations problems, nonlocal operators, and stability results for some isoperimetric problems.*

Manuscript can be found at the web page: [paduaresearch.cab.unipd.it/9141/1/thesis.pdf](http://paduaresearch.cab.unipd.it/9141/1/thesis.pdf).

### Master degree

**October 2010-July 2012:** Department of Mathematics "Ulisse Dini", University of Florence (Italy).

**13 July 2012:** Thesis defence, with first-class honours, "Ulisse Dini" University of Florence (Italy).

**Supervisor:** Prof. Paolo Salani.

**Thesis:** *Stability results of isoperimetric inequalities for some Monge-Ampère functionals.*

### Research activities

- In my bachelor and master thesis I worked in calculus of variations and geometric (especially convexity) properties for solutions of elliptic and parabolic equations. Within this area of research my specific interests have been **Isoperimetric and Brunn-Minkowski inequalities for variational functionals** and quantitative results (see papers [7] and [8]).
- In my PhD thesis I worked in nonlinear partial differential equations, in particular Hamilton-Jacobi equations and viscosity solutions. Within this field, my main interests are:



- **Viscosity solutions for Hamilton-Jacobi equation: homogenization and singular perturbations problems.** Applications to large deviations of multiscale stochastic volatility models (see papers [5] and [6]).
- **Integro-partial differential equations of Hamilton-Jacobi type related to Lévy processes.** Specifically, well-posedness of Neumann boundary value problems and large time behaviour of evolutive problems (see paper [4]).
- **Finite horizon optimal control problems with discontinuous dynamics and costs,** continuous and discontinuous terminal costs (see paper [1]).
- Following the line of research of my PhD, I collaborate with Adina Ciomaga, researcher in Paris Diderot University and Erwin Topp, researcher at the University of Santiago of Chile on: **nonlocal Hamilton-Jacobi equations**, regularity results with applications to homogenization (see preprint [1]).
- Within the ERC project I developed the following lines of research:
  - **non convex non smooth sparse optimization**, analytical and numerical aspects, with applications in optimal control of PDEs, reconstruction of images, and fractures mechanics (see papers [2], [3] and Proceeding [1]).
  - **inverse problems in fractures mechanics** for the identification of crack by shape optimization techniques (see preprint [2]).
- Currently, I am working on **mean field games**. In particular I deal with evolutive focusing mean field games, where the coupling is a decreasing function of the distribution.

## Research periods abroad

- **November 2014-June 2015:** Laboratoire de mathématiques and physique theorique, Université Francois-Rabelais de Tours, Tours (France).  
**Supervisor:** prof. Guy Barles.  
**Topics of research:**
  - Integro-partial differential equations related to Lévy processes. Neumann boundary value problems for nonlocal Hamilton-Jacobi equations of Lévy type: comparison principles, existence and uniqueness results and large time behavior for evolutive problems (see paper [4]).
- **5 months PhD stage (November 2015-March 2016):** ENSTA ParisTech, Palaiseau, Paris (France).  
**Supervisor:** prof. Hasnaa Zidani.  
**Topics of research:**
  - Finite horizon optimal control problems in multi-domains with continuous and discontinuous solutions. Characterization of the junction conditions on the interfaces as Hamilton-Jacobi-Bellman equations, comparison principle and stability results (see paper [1]).
- **2 weeks visiting period (20/04/2018-04/05/2018):** University of Santiago, Chile, collaboration with Erwin Topp on the preprint [1].

## Publications

- 1 *Inverse problem in breaking line identification by shape optimization*, D. Ghilli, V. Kovtunenkov, K. Kunisch, Journal of Inverse and Ill-posed problems, in press 2019, DOI 10.1515/jiip-2019-0047.
- 2 *On a monotone scheme for nonconvex nonsmooth optimization with applications to fracture*

- mechanics*, D. Ghilli, K. Kunisch, JOTA, Vol. 183, Issue 2, 609-641, 2019, DOI 10.1007/s10957-019-01545-4.
- 3 *Junction conditions for finite horizon optimal control problems on multi-domains with continuous and discontinuous solutions*, D. Ghilli, Z. Rao, H. Zidani, ESAIM:COCV, 2018, DOI 10.1051/cocv/2018072.
  - 4 *On the monotone and primal dual active set schemes for  $\ell^p$ -type problems,  $p \in (0, 1]$* , D. Ghilli, K. Kunisch, Computational Optimization and Applications 72 (1), 45-85, 2018.
  - 5 *Viscosity methods for large deviations estimates of multiscale stochastic processes*, D. Ghilli, ESAIM:COCV 24 (2), 605-637, 2018, DOI 10.1051/cocv/2017051.
  - 6 *On Neumann problems for nonlocal Hamilton-Jacobi equations with dominating gradient terms*, D. Ghilli, Calculus of Variations and Partial Differential Equations 56:139, 2017, DOI 10.1007/s00526-017-1225-6.
  - 7 *Quantitative Borell-Brascamp-Lieb inequalities for compactly supported power concave functions (and some applications)*, D. Ghilli, P. Salani, Journal of Convex Analysis 24 (3), 857-888, 2017.
  - 8 *Large deviations for some fast stochastic volatility models by viscosity methods*, M. Bardi, A. Cesaroni, D. Ghilli, DCDS-A, 35 (9), 2015, DOI:10.3934/dcds.2015.35.3965.
  - 9 *Stability of isoperimetric type inequalities for some Monge-Ampère functionals*, D. Ghilli, P. Salani, Annali di Matematica pura ed applicata, Vol. 193, Issue 3, 643-661, 2014, DOI 10.1007/s10231-012-0295-5.

## Preprints

- 1 *Periodic homogenization for weakly elliptic Hamilton-Jacobi-Bellman equations with critical fractional diffusion*, A. Ciomaga, D. Ghilli, E. Topp, Preprint 2020, submitted.
- 2 *Non existence for focusing time dependent mean field games*, M. Cirant, D. Ghilli, Preprint 2020.
- 3 *Semiconcavity estimates for Hamilton-Jacobi equations with applications to asymptotics for small nonlinear price impact*, M. Cirant, D. Ghilli, Preprint 2020.
- 4 *Rate of convergence for singular perturbations of Hamilton-Jacobi equations in the whole space*, D. Ghilli, C. Marchi, P. Mannucci, Preprint 2020.

## Proceedings

- 1 *A monotone scheme for sparsity optimization in  $\ell^p$  with  $p \in (0, 1]$* , D. Ghilli, K. Kunisch, IFAC 2017 Proceeding.

## Invited seminars (45-60 minutes)

- *On Neumann problems for nonlocal Hamilton-Jacobi equations related to jump processes, some recent results*, University of Paris-Dauphine (France), Autumn 2018.
- *On Neumann problems for nonlocal Hamilton-Jacobi equations related to jump processes, some recent results*, University of Padua (Italy), January 2017.
- *On Neumann problems for nonlocal Hamilton-Jacobi equations related to jump processes, some recent results*, Johann Radon Institute RICAM (Linz), June 2016.
- *Large deviations for fast stochastic volatility models by viscosity methods*, Séminaire de Probabilité-Statistique-Contrôle, ENSTA ParisTech (France), January 2016.
- *Hamilton-Jacobi equations and optimal control: some recent results*, Institute of Mathematics and Scientific Computing (Graz, Austria), October 2015.
- *On Neumann problems for nonlocal Hamilton-Jacobi equations with dominating gradient terms*,

Séminaire d'Analyse, Université de Rouen, Insa, (France), June 2015.

- *Large deviations for fast stochastic volatility models by viscosity methods*, Séminaire d'Analyse Numerique, Université de Rennes 1, Insa, (France), March 2015.
- *Large deviations for fast stochastic volatility models by viscosity methods*, Séminaire PDE, Laboratoire de mathématiques and physique theorique, Université Francois-Rabelais de Tours (France), October 2014.

### Invited talks

- Future: *Non existence for evolutive focusing mean field games*, 8th European Congress of Mathematics 2020, July 2020, Slovenia.
- Future: *Inverse problem in crack identification by shape optimization*, 10th International Conference "Inverse problems: modeling and simulation", Malta, May 2021.
- *Inverse problem in crack identification by shape optimization*, "ICCOPT 2019", Berlin (Germany), August 2019.
- *Theory and numerical practice for optimization problems involving  $\ell^p$ -functionals, with  $p \in (0, 1]$* , "GAMM 2019", Vienna (Austria), February 2019, (20 minutes).
- *Theory and numerical practice for optimization problems involving  $\ell^p$ -functionals, with  $p \in (0, 1]$* , "ORCOS: VC2018", Vienna (Austria), July 2018 (25 minutes).
- *Theory and numerical practice for optimization problems involving  $\ell^p$ -functionals, with  $p \in (0, 1]$* , "PGMO days 2017", Paris (France), November 2017, (25 minutes).
- *On monotone and primal-dual active set schemes for  $\ell^p$ -type problems, with  $p \in (0, 1]$*  "IFAC 2017", July 2017 (30 minutes).
- *Large deviations for fast stochastic volatility models by viscosity methods*, "Nonlinear PDEs: optimal control, asymptotic problems and mean field games", Padua (Italy), February 2016 (30 minutes).

### Organized conferences and mini symposia in conferences

- "Mean field games and related topic 5 ", Levico Terme, September 2019.
- Nonsmooth PDE-constrained optimization: problems and methods, "EWM General Meeting", Karl-Franzens University of Graz, Graz (Austria), 3-7 September 2018.

### Communications at conferences

- *Theory and numerical practice for optimization problems involving  $\ell^p$ -functionals, with  $p \in (0, 1]$* , "GAMM 2018", Munich (Germany), March 2018 (20 minutes).
- *On monotone and primal dual active set schemes for  $\ell^p$ -type problems, with  $p \in (0, 1]$* , "Optimization of Infinite Dimensional Non-Smooth Distributed Parameter Systems", Darmstadt (Germany), October 2017 (40 minutes).
- *On monotone and primal-dual active set schemes for  $\ell^p$ -type problems, with  $p \in (0, 1]$*  International workshop "Optimal control of Dynamical Systems ", Mariatrost (Graz, Austria), May 2017.
- *On nonlocal Hamilton-Jacobi equations related to jump processes, some recent results*, Workshop on Numerical Methods for Hamilton-Jacobi equations in optimal control and related fields, Linz (Austria), November 2016.
- *A monotone scheme for sparsity optimization in  $\ell^p$  with  $p \in (0, 1]$* , "Imaging with Modulated/Incomplete Data 2016", Graz (Austria), September 2016.
- *On Neumann problems for nonlocal Hamilton-Jacobi equations related to jump processes*, "Analysis

and Applications of Stochastic systems", IMPA, Rio de Janeiro (Brasil), 28/03/16-1/04/16.

- *Large deviations for fast stochastic volatility models by viscosity methods*, Workshop "Optimal Control of Partial and Ordinary Differential Equations", École Polytechnique Palaiseau, Paris (France), November 2015.
- *On Neumann problems for nonlocal Hamilton-Jacobi equations with dominating gradient terms*, "Partial differential equations, optimal design and numerics ", Centro de Cienca de Benasque Pedro Pasqual, Benasque (Spain), August 2015.
- *Large deviations for fast stochastic volatility models by viscosity methods*, "New perspectives in optimal control and games ", Rome (Italy), November 2014.
- *Large deviations for fast stochastic volatility models by viscosity methods*, "Recent advances in mathematical finance ", Padua (Italy), September 2014.
- *Large deviations for fast stochastic volatility models by viscosity methods*, "Young researchers meeting in probability, ", WIAS-TU Berlin and Unipotsdam (Germany), October 2014.
- *Stability results for Urysohn inequalities involving elliptic operators*, "Joint research program on nonlinear PDE's of University of Florence and Tohoku University ", Florence (Italy), March 2014.
- *Stability of isoperimetric inequalities for some Monge-Ampère functionals*, Conference "Convex geometry ", Centro Internacional de Encuentros Matematicos, Castro Urdiales (Spain), September 2013.
- *Stability of isoperimetric inequalities for some Monge-Ampère functionals*, "Workshop for Young researchers in mathematics ", University Ovidius Costanta (Romania), May 2012.

## Other conferences and summer schools

- "Mean Field Games and Related Topics-5", Levico Terme (Trento, Italy), September 2019.
- CIME summer school "Mean Field games ", Cetraro (Italy), June 2019.
- Summer school ALOP: Optimization in Machine Learning and Data Science, Trier (Germany), August 2017.
- Fifth meeting of the ANR HJNet, Tours (France), January 2016.
- Mean-Field games and related topics 3, Paris (France), June 2015.
- CIME summer course "Partial differential equations and geometric measure theory ", Cetraro (Italy), June 2014.
- EMS summer school "Workshop on interaction between dynamical system and partial differential equations JISD2014 ", Barcelona (Spain), June 2014.
- Mean-Field games and related topics 2, Padua (Italy), September 2013.
- Control day and tutorials "Numerical analysis of optimal control problems ", Padua (Italy) september 2013.
- Scuola matematica interuniversitaria "Trends in Nonlinear and parabolic elliptic equations, Cortona (Italy), July 2012.
- Frontiers of Mathematics and applications III, Universidad internacional Menendes Pelayo, Santander (Spain), August 2012.

## Teaching

- Exercises for the course "Istituzioni di Analisi" (Analysis), winter semester 2019/2020, University of Padua. Total of hours: 16. Language: Italian.
- Exercises for the course "Partial Differential Equations", winter semester 2018/2019, University of Graz (Austria). Total of hours: 13. Language: English.
- Exercises for the course "Computational Mathematic 2", winter semester 2017/2018, University

of Graz (Austria). Total of hours: 14. Language: English.

- Exercises for the course "Introduction to complex analysis", winter semester 2016/2017, University of Graz (Austria). Total of hours: 14. Language: English.

## Computer skills

Good knowledge of Matlab. Elementary knowledge of C and Mathematica.

## Languages

- Italian: mother tongue
- English: fluent: C1 (IELTS, grade:7.5)
- French: fluent: C1
- German: intermediate: B2
- Spanish: elementary

## References

- Prof. Martino Bardi, Department of Mathematics "Tullio Levi-Civita", University of Padua (Padua, Italy).  
Email: bardi@math.unipd.it
- Prof. Guy Barles, Laboratoire de mathématiques et physique théorique, University of Tours (Tours, France).  
Email: barles@lmpt.univ-tours.fr
- Dr. Adina Ciomaga (Maître de conférences), Laboratoire LJLL, University Denis Diderot (Paris VII, France).  
Email: adina@math.univ-paris-diderot.fr
- Prof. Hasnaa Zidani, ENSTA ParisTech, Palaiseau (Paris, France).  
Email: hasnaa.zidani@ensta.fr
- Prof. Karl Kunisch, Institute of Mathematics and Scientific Computing, University of Graz (Graz, Austria).  
Email: karl.kunisch@uni-graz.at
- Prof. Paolo Salani, Department of mathematics "Ulisse Dini", University of Florence (Florence, Italy).  
Email: paolo.salani@unifi.it

## Personal interests

- Sports: tennis, swimming, trekking, dancing- I took dancing lesson and danced. for eight years (jazz and classical dance).
- Reading: books, newspapers, journals..
- Gardening.
- Studying new languages.

# Curriculum vitae

Alessandro Iacopetti

## Dati personali:

Nome: Alessandro.

Cognome: Iacopetti.

## Istruzione e formazione:

Dottorato di Ricerca in Matematica, Università di Roma Tre, conseguito in data 09/04/2015.

Titolo della tesi: “Sign-changing solutions of the Brezis–Nirenberg problem: asymptotics and existence results”.

Relatore: Prof.ssa Filomena Pacella.

Laurea specialistica in Matematica, Università di Pisa, conseguita in data 28/03/2008.

Voto: 110/110 con lode.

Titolo della tesi: “Sistemi ellittici totalmente nonlineari del secondo ordine”. Relatore: Prof. Antonio Tarsia.

## Posizioni accademiche ricoperte:

Titolare di una posizione triennale come “Chargé de Recherches” (Research Assistant), finanziata da FNRS-F.R.S. (Fonds de la Recherche Scientifique-Belgium). Istituzione scelta per svolgere l’attività di ricerca: Université Libre de Bruxelles. In servizio da Febbraio 2020.

Assegnista di ricerca presso l’Università di Roma “La Sapienza”, Febbraio 2019-Gennaio 2020.

Post-Doc presso l’Université Libre de Bruxelles, Luglio 2017-Giugno 2018.

Assegnista di ricerca presso l’Università di Torino, Maggio 2015-Giugno 2017.

Assegnista di ricerca presso l’Università di Roma “La Sapienza”, Aprile 2015-Maggio 2015.

## Campi di ricerca:

Analisi Nonlineare, Analisi Geometrica, Equazioni differenziali nonlineari , Calcolo delle Variazioni, Teoria della Regolarità.

**Esperienza didattica:**

- Supervisore di una parte della tesi di Dottorato del Dr. Gabriele Cora (Univ. di Torino), nel periodo Febbraio 2016–Giugno 2017.
- Mini-corso (6 ore) a livello di Dottorato sul problema di Brezis-Nirenberg frazionario, pianificato per un gruppo di studio sui problemi differenziali non-locali organizzato dalla Prof.ssa S. Terracini (Univ. of Torino) e rivolto a studenti di dottorato e postdocs, Ottobre 2015-Gennaio 2016.
- Esercitatore per il corso “Analisi Matematica II” per il corso di laurea in Fisica, docente titolare del corso: Prof. P. Esposito, primo semestre dell’anno accademico 2014/2015, Università di Roma Tre.
- Docente di Matematica e Fisica presso l’Istituto superiore “G.G. Byron” di Lucca, Febbraio 2009–Luglio 2011.

**Finanziamenti:**

- Il progetto di ricerca intitolato “Gamma-convergenza e rilassamento in problemi variazionali nonlocali e degeneri/singolari, ed applicazioni” è stato finanziato da GNAMPA-INDAM, coordinatore del progetto: Dr. Gabriele Cora.
- Il progetto di ricerca intitolato “Nonlinear Partial Differential Equations arising in Geometry and Applied sciences” è stato finanziato dall’Università di Roma “La Sapienza”. Coordinatore del progetto: Prof.ssa F. Pacella.
- Ad integrazione della posizione di Chargé de Recherches, ho ottenuto un finanziamento da parte di FNRS-F.R.S. per un ammontare di 15.000 euro per svolgere missioni durante il periodo 01/02/2020–31/01/2023.
- Il progetto di ricerca “The Born-Infeld electrostatic model: existence, regularity and multiplicity of solution” è stato finanziato da GNAMPA-INDAM, coordinatore del progetto: Prof.ssa Francesca Colasuonno.
- Membro Junior dell’advanced ERC grant n. 339958 “Complex Patterns for Strongly Interacting Dynamical Systems - COMPAT”, il cui principal investigator è la Prof.ssa Susanna Terracini.

**Conferenze su invito a congressi internazionali:**

- “Geometric and Analytical Aspects of Nonlinear Elliptic Equations and Related Evolution Problems”, Oaxaca (CMO), Mexico (10-15 Maggio 2020) [rinviata al 2021].
- “Intensive Week of PDEs@Cogne”, Cogne (2-7 Giugno 2019)
- “Partial Differential Equations in Analysis and Mathematical Physics”, Cagliari (30 Maggio-1 Giugno 2019).
- “Nonlinear Analysis and PDEs in Caserta”, Università degli Studi della Campania “L. Vanvitelli”, Caserta (10-14 Settembre 2018).
- “Topics in nonlinear analysis and applications”, Università Milano “Bicocca”, Milano (15-16 Marzo 2017).
- “Roma Caput PDE”, Università “La Sapienza”, Roma (23-26 Gennaio 2017).
- “PDEs at the Grand Paradis”, Cogne (20-24 Giugno, 2016).
- “Bruxelles-Torino talks in PDEs”, Torino, (2-5 Maggio 2016).

**Seminari su invito presso Università:**

- Seminario presso il Dipartimento di Matematica “G. Peano”, Università degli Studi di Torino, Torino (09 Dicembre 2019).
- Seminario presso il Dipartimento di Matematica “F. Enriques”, Università degli Studi di Milano, Milano (20 Novembre 2019).
- Seminario presso il Dipartimento di Matematica “G. Castelnuovo”, Università “La Sapienza”, Roma (3 Ottobre 2019).

- Seminario presso il Dipartimento di Matematica “G. Castelnuovo”, Università “La Sapienza”, Roma (4 Febbraio 2016).

#### Comunicazioni brevi:

- “Nonlinear Analysis in Rome”, University of Notre Dame Rome (26-30 Giugno 2017).
- “The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications”, invitato per la sessione speciale SS52: Function Spaces and Inequalities, Orlando, Florida (USA) (1-5 Luglio, 2016).
- “9th European Conference on Elliptic and Parabolic Problems”, Gaeta (Italia). (23-27 Maggio 2016).
- “Two- Day Meeting in Honor of Antonio Ambrosetti”, Venezia, Istituto Canossiano Le Romite (Dicembre 2014).

#### Partecipazione a Scuole:

- “Intensive week of PDEs at Spa”, Spa (Belgio) (11-15 Dicembre 2017).
- “PDEs and Applications”, Napoli (8-12 Febbraio 2016).
- “Corso Intensivo di Calcolo delle Variazioni”, presso il dipartimento di Matematica dell’Università di Catania (9-14 Giugno 2014).
- “Spring school on nonlinear PDEs” presso il Dipartimento di Matematica de “La Sapienza”, Roma (24-27 Marzo 2014).
- “P(n) School on Recent Trends in Nonlinear PDEs” presso il Dipartimento di Matematica de “La Sapienza”, Roma (17-20 settembre 2013).
- “Nonlinear PDEs from Geometry and Physics”, organizzata dal dipartimento di Matematica di Roma Tre (17-21 Settembre 2012).
- “Trends in Nonlinear Elliptic and Parabolic Equations” organizzata dalla Scuola Matematica Internazionale (SMI) a Cortona (15-27 Luglio 2012).

#### Periodi di visita:

- Università di Torino, invitato dal Prof. Paolo Caldirolì, 11–18 Maggio 2018, 3–28 Settembre 2018, 9–12 Dicembre 2019.
- Université Libre de Bruxelles, invitato dal Prof. Denis Bonheure, 13-18 Novembre 2016.

#### Pubblicazioni:

- (13) G. Galise, A. Iacopetti, F. Leoni, *Liouville-type results in exterior domains for radial solutions of fully nonlinear equations*, Journal of Differential Equations (in stampa), DOI: 10.1016/j.jde.2020.03.051
- (12) G. Galise, A. Iacopetti, F. Leoni, F. Pacella, *New concentration phenomena for a class of radial fully nonlinear equations*, Annales de l’Institut Henri Poincaré C, Analyse non linéaire (in stampa), DOI: 10.1016/j.anihpc.2020.03.003
- (11) G. Cora, A. Iacopetti, *Sign-changing bubble-tower solutions to fractional semilinear elliptic problems*, Discrete and Continuous Dynamical Systems-A, Vol. 39, No. 10, 6149–6173 (2019).
- (10) D. Bonheure, A. Iacopetti, *Spacelike radial graphs of prescribed mean curvature in the Lorentz-Minkowski space*, Analysis & PDE, Vol. 12, No. 7, 1805-1842 (2019).
- (9) D. Bonheure, A. Iacopetti, *On the regularity of the minimizer of the electrostatic Born-Infeld energy*, Arch. Ration. Mech. Anal. 232, 697–725 (2019).
- (8) G. Cora, A. Iacopetti, *On the structure of the nodal set and asymptotics of least energy sign-changing radial solutions of the fractional Brezis-Nirenberg problem*, Nonlinear Analysis 176, 226–271 (2018).



- (7) P. Caldiroli, A. Iacopetti, *Existence of isovolumetric  $S^2$ -type stationary surfaces for capillarity functionals*, Revista Matemática Iberoamericana 34, no. 4, 1685–1709 (2018).
- (6) A. Iacopetti, G. Vaira, *Sign-changing blowing-up solutions for the Brezis–Nirenberg problem in dimensions four and five*, Annali della Scuola Normale Superiore di Pisa, Vol. XVIII, Issue 1, 1–38 (2018).
- (5) P. Caldiroli, A. Iacopetti, *Existence of stable  $H$ -surfaces in cones and their representation as radial graphs*, Calculus of Variations and PDE's (2016), 55: 131.
- (4) A. Iacopetti, G. Vaira, *Sign-changing tower of bubbles for the Brezis–Nirenberg problem*, Commun. Contemp. Math., **18** (2016), 1550036.
- (3) A. Iacopetti, F. Pacella, *Asymptotic analysis for radial sign-changing solutions of the Brezis–Nirenberg problem in low dimensions*, Progress in Nonlinear Diff. Eq. and their Appl., Springer, Vol. 86, 325–343 (2015).
- (2) A. Iacopetti, F. Pacella, *A nonexistence result for sign-changing solutions of the Brezis–Nirenberg problem in low dimensions*, Journal of Differential Equations, 258 no. 12, 4180–4208 (2015).
- (1) A. Iacopetti, *Asymptotic analysis for radial sign-changing solutions of the Brezis–Nirenberg problem*, Annali di Matematica Pura ed Applicata, Vol. 194 Issue 6, 1649–1682 (2015).

#### Lavori in preparazione:

- (2) P. Caldiroli, A. Iacopetti, *Delaunay tori with radially symmetric prescribed mean curvature*.
- (1) D. Bonheure, A. Iacopetti, L. Mari *Existence and regularity of spacelike hypersurfaces in the Lorentz–Minkowski space, with prescribed mean curvature in  $L^p$*

#### Tesi di Dottorato:

- (1) A. Iacopetti, PhD thesis “Sign-changing solutions of the Brezis–Nirenberg problem: asymptotics and existence results”,  
<http://www.matfis.uniroma3.it/dottorato/tesi.php?dottorato=matematica>

### Attività scientifica.

L'ambito della mia attività di ricerca è quello dell'Analisi non lineare, con applicazione a questioni connesse alle Equazioni alle derivate parziali, al Calcolo delle variazioni, e alla Geometria differenziale. Una breve descrizione dei temi affrontati è la seguente:

#### Analisi Geometrica e Calcolo delle Variazioni.

Per quanto concerne l'Analisi Geometrica ed il Calcolo delle Variazioni, mi sono occupato del problema dell'ostacolo per  $H$ -superfici in coni, della loro rappresentazione globale come grafico radiale, e dell'esistenza di punti critici di tipo sella vincolati al volume per funzionali di tipo capillarità, con applicazioni al relativo problema isoperimetrico e al problema delle  $H$ -bolle (si vedano (5) e (7)).

Successivamente ho studiato il problema di Plateau per grafici radiali di curvatura media prescritta nello spazio di Lorentz–Minkowski che si appoggiano su domini limitati dello spazio iperbolico (si veda (10)). In (9) ho investigato la regolarità  $C^{1,\alpha}$ -locale del minimo dell'energia elettrostatica di Born–Infeld quando la distribuzione di carica assegnata appartiene ad  $L^p$ . Inoltre ho studiato l'esistenza di soluzioni deboli per la PDE corrispondente, la quale è governata dall'operatore di curvatura media (per ipersuperfici

di tipo spazio) nello spazio di Lorentz-Minkowski, ottenendo il primo risultato di esistenza (e regolarità) di ipersuperfici aventi curvatura media prescritta non radiale e non limitata.

Infine, in collaborazione con il Prof. P. Caldirolì stiamo completando la stesura di un articolo riguardante l'esistenza di superfici compatte immerse del tipo toro (ovvero di genere 1) aventi curvatura media prescritta radialmente simmetrica e vicina ad una costante (si veda (1) nella sezione dei lavori in preparazione).

### **Equazioni ellittiche nonlineari locali e non-locali.**

Durante il dottorato ho studiato un problema ellittico semilineare classico, noto come “Problema di Brezis-Nirenberg”. Nella relativa produzione scientifica (si vedano i lavori (1)-(4) e (6)) ho fornito contributi relativi all'analisi asintotica, all'esistenza (e non esistenza) di soluzioni che cambiano segno di energia minima del tipo “tower of bubbles”.

Come supervisore di una parte della tesi di dottorato del Dott. G. Cora, ho proposto come argomento lo studio delle proprietà qualitative ed asintotiche di soluzioni nodali di energia minima di problemi ellittici semilineari governati dal Laplaciano frazionario  $(-\Delta)^s$  (si vedano i lavori (8) e (11)). In particolare abbiamo provato che soluzioni nodali radiali nella palla di energia minima cambiano segno esattamente una volta, quando  $s$  è vicino a uno, fatto che non può essere ottenuto attraverso meri argomenti energetici come nel caso locale.

Recentemente, in collaborazione con la Prof.ssa F. Leoni e il Dott. G. Galise, abbiamo determinato condizioni necessarie e sufficienti, in relazione all'esponente  $p$ , per l'esistenza di soluzioni radiali positive del seguente problema ellittico totalmente non lineare

$$\begin{cases} -\mathcal{F}(D^2u) = u^p & \text{in } \mathbb{R}^N \setminus \overline{B}, \\ u = 0 & \text{su } \partial B, \end{cases} \quad (1)$$

dove  $\mathcal{F}$  è uno dei due operatori massimali di Pucci  $\mathcal{M}_{\lambda,\Lambda}^\pm$  e  $B$  è una palla di  $\mathbb{R}^N$ . Per maggiori dettagli si veda il lavoro (13).

Infine, in collaborazione con le Prof.sse F. Pacella, F. Leoni e il Dott. G. Galise abbiamo studiato i fenomeni di concentrazione per le soluzioni radiali che cambiano segno di problemi totalmente nonlineari del tipo

$$\begin{cases} -\mathcal{F}(D^2u) = |u|^{p-1}u & \text{in } B, \\ u = 0 & \text{su } \partial B, \end{cases} \quad (2)$$

quando  $p$  tende all'esponente critico per il quali tali soluzioni esistono (il quale varia a seconda che  $\mathcal{F} = \mathcal{M}_{\lambda,\Lambda}^+$  o  $\mathcal{F} = \mathcal{M}_{\lambda,\Lambda}^-$ ). In particolare, per  $\mathcal{F} = \mathcal{M}_{\lambda,\Lambda}^+$  abbiamo provato che tale esponente critico è strettamente compreso fra  $p_-^*$  e  $p_+^*$ , dove  $p_-^*$ ,  $p_+^*$  sono gli esponenti critici per l'esistenza di soluzioni positive (radiali) di (2) quando  $\mathcal{F} = \mathcal{M}_{\lambda,\Lambda}^-$ ,  $\mathcal{F} = \mathcal{M}_{\lambda,\Lambda}^+$ , rispettivamente. In particolare, sia per  $\mathcal{F} = \mathcal{M}_{\lambda,\Lambda}^+$  che per  $\mathcal{F} = \mathcal{M}_{\lambda,\Lambda}^-$ , i profili limite ottenuti dall'analisi asintotica delle soluzioni nodali di (2) sono completamente differenti rispetto a quelli che si hanno per il Laplaciano (per maggiori dettagli si veda il lavoro (12)).

# Gabriele Mancini

## *Curriculum Vitae*

### Current Position

Position Postdoc in Mathematical Analysis (Assegnista di ricerca)  
Institute Università degli Studi della Campania Luigi Vanvitelli  
Department Dipartimento di Matematica e Fisica  
Project “Equazioni differenziali alle derivate parziali non lineari”  
Funding MIUR project PRIN 201798CZLJ  
Supervisor Professor Giusi Vaira  
Starting date June 1, 2020

### Work Experiences

From Sep. 2019 to May 2020 INDAM Research Fellow (Assegnista di ricerca INDAM)  
Institution: Università Sapienza di Roma, Dipartimento S.B.A.I.  
Funding: INDAM - Istituto Nazionale di Alta Matematica  
Supervisor: Professor Angela Pistoia.  
Project: “Sharp Inequalities and lack of compactness for Moser-Trudinger type embeddings”

From Sep. 2018 to Aug. 2019 Postdoc in Mathematical Analysis (Assegnista di ricerca)  
Institution: Università Sapienza di Roma, Dipartimento S.B.A.I.  
Supervisor: Professor Angela Pistoia.  
Project: “Non-linear Partial Differential Equations in Geometry and Physics”

From Oct. 2017 to Aug. 2018 Postdoc in Mathematical Analysis (Assegnista di ricerca)  
Institution: Università degli Studi di Padova - Dipartimento di Matematica Tullio Levi-Civita  
Supervisor: Professor Luca Martinazzi.  
Project: “Non-linear and non-local differential equations in functional and geometric analysis” Project PP00P2-170588

From Oct. 2015 to Sep. 2017 Postdoctoral Researcher in Mathematics  
Institution: Universität Basel - Departement Mathematik und Informatik (Basel Switzerland)  
Research Group: Research Group in Mathematical Analysis  
Supervisor: Professor Luca Martinazzi.  
Funding: SNF - Swiss National Science Foundation

### Research Activity

My research interests include Calculus of Variations, Partial Differential Equations, Functional Analysis and Riemannian Geometry. Currently, I am studying the existence of solutions to a class of PDEs involving critical exponential non-linearities and high-order (possibly non-local) elliptic operators. In particular, I am interested in the properties of critical points for Adams-Moser-Trudinger functionals and in the study of Liouville-type equations, which have several applications in conformal geometry and mathematical physics. For instance, they appear in the problem of prescribing the Gaussian curvature of Riemannian surfaces and in the analysis

of Abelian Chern-Simons vortices in Electroweak theory. I am also interested in Toda systems, which are relevant in the description of holomorphic curves on projective spaces and in high temperature superconductivity.

My research focuses on the analysis of quantization and blow-up phenomena, and on their applications to the study of existence of solutions through variational and topological methods.

## Publications and preprints

- A. DelaTorre, G. Mancini, A. Pistoia, *Sign-changing solutions for the one-dimensional non-local sinh-Poisson equation*, ArXiv Preprint available at <https://arxiv.org/abs/2005.09909>
- A. DelaTorre, G. Mancini, *Improved Adams-type inequalities and their extremals in dimension  $2m$* , to appear in Communications in Contemporary Mathematics, ArXiv preprint available at <https://arxiv.org/abs/1711.00892>.
- G. Mancini, L. Martinazzi, *Extremals for fractional Moser-Trudinger inequalities in dimension 1 via harmonic extensions and commutator estimates*, Advanced Nonlinear Studies (2020), url: <https://doi.org/10.1515/ans-2020-2089>.
- M. Grossi, G. Mancini, D. Naimen, A. Pistoia, *Bubbling nodal solutions for a large perturbation of the Moser-Trudinger equation on planar domains*, Mathematische Annalen (2020), <https://doi.org/10.1007/s00208-020-01975-w>.
- G. Mancini, G. Romani, *Uniform bounds for higher-order semilinear problems in conformal dimension*, Nonlinear Analysis 192 (2020), <https://doi.org/10.1016/j.na.2019.111717>.
- A. Hyder, G. Mancini, L. Martinazzi, *Local and nonlocal singular Liouville equations in Euclidean spaces*, International Mathematics Research Notices (2019), url: <https://doi.org/10.1093/imrn/rnz149>.
- G. Mancini, P.-D. Thizy, *Glueing a peak to a non-zero limiting profile for a critical Moser-Trudinger equation*, J. Math. Anal. Appl. 472 (2019), no. 2, 1430-1457, url: <https://doi.org/10.1016/j.jmaa.2018.11.084>
- G. Mancini, P.-D. Thizy, *Non-Existence of Extremals for the Adimurthi-Druet Inequality*, Journal of Differential Equations 266 (2019), no. 2-3, 1051-1072, url: <http://doi.org/10.1016/j.jde.2018.07.065>.
- G. Mancini, L. Martinazzi, *The Moser-Trudinger inequality and its extremals on a disk via energy estimates*, Calculus of Variations and Partial Differential Equations 56:94 (2017), url: <http://doi.org/10.1007/s00526-017-1184-y>.
- S. Iula, G. Mancini, *Extremal Functions for Singular Moser-Trudinger Embeddings*, Nonlinear Analysis 156 (2017), 215-248, url: <http://doi.org/10.1016/j.na.2017.02.029>.
- G. Mancini, *Singular Liouville Equations on  $S^2$ : Sharp Inequalities and Existence Results*, preprint available at <http://arxiv.org/abs/1508.02090>.
- G. Mancini, *Onofri-type inequalities for singular Liouville equations*, Journal of Geometric Analysis 26 (2016) Issue 2, 1202–1230, url: <http://doi.org/10.1007/s12220-015-9589-3>.
- L. Battaglia, G. Mancini, *A note on compactness properties of the singular Toda system*, Atti Accad. Naz. Lincei, Rend. Lincei Mat. Appl. 26 (2015), no. 3, 299–307, url: <http://doi.org/10.4171/RLM/708>.

- L. Battaglia, G. Mancini, *Remarks on the Moser-Trudinger inequality*, Adv. Nonlinear Anal. 2 (2013), no. 4, 389–425, url: <http://doi.org/10.1515/anona-2013-0014>.

## Teaching Activity

- a.y. 2019/2020 Teaching Assistant for the course *Analisi Matematica 1* at *Università degli Studi Roma Tre*, Dipartimento di Ingegneria
- a.y. 2019/2020 Assistant Lecturer for the courses *Analisi Matematica I - Canale AO* and *Analisi Matematica I - Canale PZ* at *Università Sapienza di Roma*, Facoltà di Ingegneria Civile e Industriale, course in *Ingegneria Clinica*.
- a.y. 2018/2019 Teaching Assistant for the course *Analisi Matematica 1* at *Università degli Studi Roma Tre*, Dipartimento di Ingegneria
- a.y. 2016/2017 Lecturer for the course *Variational Methods for Elliptic PDEs* at *Universität Basel*, Departement Mathematik und Informatik
- a.y. 2015/2016 Teaching assistant for the course of *Analysis II* at *Universität Basel*, Departement Mathematik und Informatik
- November 2014 Training sessions for the *Coppa Aurea* project at *Liceo Scientifico Oberdan* (Trieste, Italy) and *Liceo Scientifico Duca degli Abruzzi* (Gorizia, Italy).
- 2007 - 2010 Tutor for the course *Analisi Matematica III* at *Università Degli Studi Roma Tre*, Dipartimento di Matematica
- 2007 - 2010 Tutor for the course *Analisi Matematica II* at *Università Degli Studi Roma Tre*, Dipartimento di Matematica

## Education

- 2011–2015 Ph.D. in Applied Mathematics, *SISSA - Scuola Internazionale Superiore di Studi Avanzati, Trieste, Italy*  
Date: September 25, 2015  
Thesis: *Sharp Inequalities and Blow-up Analysis for singular Moser-Trudinger Embeddings*  
Advisor: Prof. Andrea Malchiodi
- 2008–2011 Master's Degree in Mathematics, *Università degli Studi Roma Tre, Rome, Italy*  
Graduation Marks: 110/110 cum laude  
Thesis Title: *Moser-Trudinger inequality and applications to a geometric problem*  
Advisor: Prof. Giovanni Mancini
- 2005–2008 Bachelor's Degree in Mathematics, *Università degli Studi Roma Tre, Rome, Italy*  
Graduation Marks: 110/110 cum laude  
Final Exam: B-type final exam (PFB).
- 2000–2005 High School Diploma, *Liceo Scientifico Statale Farnesina, Rome, Italy*  
Indirizzo Scientifico Sperimentale PNI  
Final Mark: 100/100  
Thesis: *La teoria della relatività di Einstein: originalità ed inquadramento storico culturale*

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## Honors and Awards

- August 2019 Winner of a national research grant by *Istituto Nazionale Di Alta Matematica* (INDAM) for the academic year 2019-2020.
- March 2009 Grant by *Istituto Nazionale Di Alta Matematica* (INDAM) for first year students of Master's course of Mathematics
- September 2005 Grant by *Università degli Studi Roma Tre* for first year students of Bachelor's course of Mathematics
- March 2005 Winner of the free enrolment contest by *Università degli Studi Roma Tre*

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## Other Experiences

- February 2020 Short visit at *Osaka-City University* (Osaka, Japan) from 18.02.2020 to 22.02.2020, for a scientific collaboration with Prof. Futoshi Takahashi and Prof. Daisuke Naimen
- February 2020 Member of the research project "*Aspetti variazionali di alcune PDE in geometria conforme*" funded by the INDAM group *Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni* (GNAMPA)
- 2019-2020 Member of the research project "*Esistenza, unicità e proprietà qualitative di soluzioni di equazioni differenziali su varietà Riemanniane*", funded by Sapienza University of Rome, coordinated by Prof. Massimo Grossi
- 2018 Two one-week visits (22-27.04.2018 and 25-30.11.2018) at the *University of Lyon I, Institute Camille-Jordan* (Lyon, France) for a scientific collaboration with Prof. Pierre-Damien Thizy
- April 2018 A short visit at the *University of British Columbia* (Vancouver, Canada) for a scientific collaboration with Dr. Ali Hyder (member of the research group of Prof. Juncheng Wei), from 7.04.2018 to 12.04.2018.
- July 2015 A one-week visit at *Scuola Normale Superiore di Pisa* in the research group of Professor Andrea Malchiodi, from 11.07.2015 to 17.07.2015
- 2014-2015 Two visits at the *University of Basel, Department of Mathematics and Computer Science*, (Basel, Switzerland) in the research group of Prof. Luca Martinazzi, for a total duration of approximately two months.
- 2013 Three visits at the *University of Warwick* (UK) in the research group of Professor Andrea Malchiodi for a total duration of approximately seven months.
- Since 2013 Member of the INDAM research group *Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni* (GNAMPA).
- Since 2013 Reviewer for several Mathematical Journals including:
- *Advances in Calculus of Variations*
  - *Analysis and PDE*
  - *Calculus of Variations and Partial Differential Equations*
  - *Communications in Partial Differential Equations*
  - *Discrete and Continuous Dynamical System*
  - *International Mathematics Research Notices*
  - *Journal of Functional Analysis*
  - *Nonlinear Analysis*
  - *Transactions of the American Mathematical Society*
  - *Zeitschrift für angewandte Mathematik und Physik*

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## Seminars and Presentations

- February 2020 *Strongly Perturbed Moser-Trudinger Functionals And Their Critical Points In Dimension Two*  
Workshop: Variational Analysis On Critical Problems Of Nonlinear Partial Differential Equations, Osaka-City University, Osaka, Japan
- January 2020 *Bubbling solutions for large perturbations of the Moser-Trudinger critical equation on planar domains*  
V Congreso de Jóvenes Investigadores de la RSME - Castelló, Spain
- August 2019 *Bubbling nodal solutions for a large perturbation of the Moser-Trudinger critical equation on planar domains*  
Sharp geometric inequalities and applications to geometry and PDEs, Tsinghua Sanya International Mathematics Forum, Sanya, China
- June 2019 *Bubbling phenomena for a class of perturbed Moser-Trudinger critical equations in dim. two*  
Intensive Week of PDEs@Cogne, Cogne, Italy
- May 2019 *Energy quantification for perturbed Moser-Trudinger functionals in dimension two*  
International Conference on Elliptic and Parabolic Problems, Gaeta, Italy
- May 2019 *Bubbling nodal solutions for a large perturbation of the Moser-Trudinger eq. on planar domains*  
Nonlinear Geometric PDE's, Banff International Research Station, Banff, Alberta, Canada
- December 2018 *Energy quantification for Moser-Trudinger type nonlinearities in dimension two*  
Dipartimento di Matematica Guido Castelnuovo, Università Sapienza di Roma, Rome, Italy
- May 2018 *Improved Adams-type inequalities and their extremals in dimension  $2m$*   
Università degli studi di Padova, Padova, Italia
- May 2017 *Critical points and extremals of Moser -Trudinger type functionals on a disk,*  
Università degli studi di Milano, Milano, Italia
- May 2017 *The Moser -Trudinger inequality and its extremals on a disk via energy estimates*  
International Conference on Elliptic and Parabolic Problems, Gaeta, Italy
- June 2016 *Critical points and Extremals of the Moser-Trudinger inequality*  
2016 EWM-EMS Summer School, Institut Mittag-Leffler, Stockholm, Sweden
- May 2015 *Compactness Properties for Singular Liouville Equations and Systems*  
Universität Basel, Basel, Switzerland
- May 2015 *Onofri-type Inequalities for Singular Liouville Equations on  $S^2$*   
Università di Roma Tor Vergata, Rome, Italy
- February 2015 *Mass Quantization for Liouville Equations and Toda Systems*  
AJS seminar, SISSA, Trieste, Italy
- March 2014 *Onofri's inequality and blow-up analysis for the singular Liouville equation.*  
AJS seminar, SISSA, Trieste, Italy
- February 2013 *Remarks on the Moser-Trudinger inequality*  
University of Warwick, Coventry, UK

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## Latest Conferences and Schools Attended

- June 2020 *IWPDE - Intensive Week on PDEs on the WEB*, sponsored by Università di Roma La Sapienza, Universidade de Lisboa, Università di Torino

- February 2020 *Variational Analysis On Critical Problems Of Nonlinear Partial Differential Equations*, Osaka-City University, Osaka, Japan
- January 2020 *V Congreso de Jóvenes Investigadores de la RSME* - Castelló, Spain
- August 2019 *Sharp geometric inequalities and applications to geometry and PDEs*, Tsinghua Sanya International Mathematics Forum, Sanya, China
- July 2019 *XI Workshop In Nonlinear Differential Equations*, Collegio C. Cattaneo, Varese, Italy
- June 2019 *Intensive Week of PDEs@Cogne*, Cogne, Italy
- May 2019 *International Conference on Elliptic and Parabolic Problems*, Gaeta, Italy
- May 2019 *Nonlinear Geometric PDE's*, Banff International Research Station, Banff, Alberta, Canada
- March 2019 *Variational approaches to PDE's*, Università di Roma "Tor Vergata", Rome, Italy
- February 2019 *Advances and Challenges in Nonlinear Elliptic Systems*, Villa Toeplitz, Varese, Italy
- February 2019 *XXIX Convegno Nazionale di Calcolo delle Variazioni*, Levico Terme (Trento), Italy
- September 2018 *Nonlinear Analysis and PDEs*, Università della Campania Luigi Vanvitelli, Caserta, Italy
- July 2018 *Mini-courses in Mathematical Analysis 2018*, Università degli Studi di Padova, Padova, Italy
- June 2018 *INDAM Meeting - Nonlinear PDEs in Geometry and Physics*, Cortona, Italy
- April 2018 *Physical, Geometrical and Analytical Aspects of Mean Field Systems of Liouville-Type*, Banff International Research Station, Banff, Alberta, Canada
- February 2018 *Young PDE's @ Roma*, Università Sapienza di Roma - Dipartimento SBAI, Rome, Italy
- February 2018 *XXVIII Convegno Nazionale di Calcolo delle Variazioni*, Levico Terme (Trento), Italy
- January 2018 *2nd Italian-Chilean Workshop in PDE's*, Università Sapienza di Roma, Rome, Italy

## Languages

- Italian Mother tongue.
- English B2 level.

## Computer skills

- Very good knowledge of LaTeX language
- Good knowledge of C programming language
- Good knowledge of Mathematica
- Good knowledge of Windows operating system and Microsoft Office Package
- Basic knowledge of Linux Operating system

Rome, July 15, 2020

Gabriele Mancini



## Curriculum Vitae: Jessica Elisa Massetti

- **Current Position:**

Since Oct. 2019 - RTDa in MAT05, Dip. Matematica e Fisica, Univ. Roma Tre (Italy).

- **Previous Positions:**

2018-2019 - Post doctoral researcher, *Junior Visiting Position* at Centro Ricerca Matematica E. De Giorgi, Scuola Normale di Pisa (Italy)

2016-2018 - Post doctoral researcher in the frame of the ERC project "Hamiltonian PDEs and small divisor problems: a dynamical systems approach", Univ. Roma Tre

2014-2016 - Teaching and Researching position (ATER), Univ. Paris Dauphine, CEREMADE (France)

- **Education:**

2015 October - Ph.D (grade: first class honor), Observatoire de Paris PSL Research University

Advisors: Prof. Alain Chenciner and Jacques Féjoz.

Boards of examiners: J. Laskar (president), L.Chierchia and J-P. Marco (referees), B. Fayad, A.Chenciner and J.Féjoz.

2011 - Master Degree (*Laurea Magistrale*) in Mathematics (summa cum laude), Dept. of Mathematics, Università degli Studi di Milano.

2010-2011 Exchange Student (Erasmus Mobility Program) - M2 recherche, Université Paris 11 Orsay

Defence of the mémoire de Master, grade: 18.75/20. Advisor: Prof. J. Féjoz

2009 - Bachelor Sc. *Laurea Triennale* in Mathematics (102/110), Università degli Studi di Milano.

- **Grants and fellowship**

2020 - Principal Investigator of "Spectral and Dynamical Properties of Hamiltonian Systems", grant "progetto GNAMPA" - issued by INdAM

2019 Oct. - Posto di ricercatore a tempo determinato tipo a) in MAT05 - Univ. Roma Tre

2018 Oct. - Assegno di ricerca (durata biennale) "*Junior Visiting Position*" in Dynamical Systems at Centro di Ricerca Matematica Ennio De Giorgi, Scuola Normale Superiore, Pisa

2017 June - 2018 Oct. Assegno di Ricerca Funded by the ERC project HamPDEs

2016 June - 2017 June Assegno di Ricerca Funded by the ERC project HamPDEs

2015 - Teaching and research grant at Université Paris-Dauphine, CEREMADE

2014 - Teaching and research grant at Université Paris-Dauphine, CEREMADE

2011 - Teaching grant at Observatoire de Paris

2011 - Three years Ph.D. fellowship issued by the École Doctorale 127, Observatoire de Paris

2010 - One year Fellowship (M2 recherche) Université Paris 11 Orsay, Mathematics dept.

- **Publications and preprints**

1 - Biasco L., Massetti J. E. & Procesi M., Almost periodic invariant tori for the NLS on the circle (2019), accepted for publication on Annales de l'Institut Henri Poincaré, Analyse nonlinéaire.

<https://arxiv.org/abs/1903.07576>

2 - Biasco L., Massetti J. E. & Procesi M. An Abstract Birkhoff Normal Form Theorem and Exponential Type Stability of the 1d NLS. Commun. Math. Phys. 375, 2089–2153 (2020)

3 - Biasco L., Massetti J. E. & Procesi M. Exponential and sub-exponential stability times for the NLS on the circle. Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl. 30 (2019), no. 2, 351–364

4 - Massetti J. E., Normal forms for perturbations of systems possessing a Diophantine invariant torus. Ergodic Theory Dynam. Systems 39 (2019), no. 8, 2176–2222.

5 - Massetti J. E., A normal form à la Moser for diffeomorphisms and a generalization of Rüssmann's translated curve theorem to higher dimensions. Anal. PDE 11 (2018), no. 1, 149–170.

6 - Massetti J.E. & Sorrentino A. On the rigidity of integrable deformations of twist maps and Hamiltonian flows, Preprint, ArXiv 2020.

7 - Barbieri S., Marco J.P. & Massetti J.E. Flexibility and analytic smoothing in averaging theory, Preprint, ArXiv 2020

8 - Biasco L., Massetti J. E. & Procesi M., On the construction of Sobolev Almost periodic invariant tori

for the 1d NLS, Preprint, ArXiv 2020

9 - Marmi, S. & Massetti, J. E. Around the global linearization of germs of Holomorphic maps. Preprint, 2019

10 - Massetti, J.E. Normally hyperbolic tori via elliptic methods: an example, Preprint, ArXiv 2016.

11 - Massetti J. E. Quasi-périodicité et quasi-conservativité, Ph.D thesis, Observatoire de Paris (2015)

- **Invited talks and lectures:**

- Invited speaker at **International Conferences**, among which:

**Weak KAM theory XXV years later (in honor of A. Fathi's 70's birthday)**, Avignon (2021)

**H2020 in Hamiltonian Dynamics**, Venice (2021)

**Conference in Honor of Jean-Pierre Marco**, Observatoire de Paris (2020)

**BIRS-CMO Workshop in Hamiltonian PDEs**, Oaxaca, Mexico (2019)

**DinAmici VI**, Centro de Giorgi (2019)

**Symmetries and Perturbation Theory**, Pula (2018)

**Imperial College**, London Aspects of Dynamical Systems (2017)

**University of Warwick**, Warwick Dynamical Systems Workshop (2016)

**The 11th AIMS Conference on Dynamical Systems**, Orlando, USA (2016)

**Euler International Mathematical Institute**, St. Petersburg, Russia, International colloquium on Dynamical Systems and KAM theory (2015)

**Institut Henri Poincaré**, Paris, France (2013) invited lecture at GRAVASCO: IHP's thematic trimester

- Invited talks at **Departemental Seminars**, among which:

**Augsburg University** (2020) - **Centro di Ricerca Matematica E. De Giorgi**, Scuola Normale Superiore, Pisa (2018) - **Université Nice Sophia-Antipolis** (2018) - **Institut Mathématique de Jussieu PRG**, Univ. Paris 7 (2018) - **Università degli Studi di Roma Tor Vergata** (2017) - **Università di Napoli Federico II** (2016) - **Institut de Mathématiques de Bourgogne**, Dijon, France (2016) - **Université d'Avignon** (2016) - **Institut Mathématique de Jussieu, Paris 6** (2016) - **Université Nice Sophia-Antipolis** (2015) - **Università degli Studi di Milano** (2013)

- **Invited scientific visits:**

Univ. degli Studi di Milano, dept. Mathematics (May 2019) - Université Paris-Diderot, Paris 7 dept. Mathematics (March 2018 & February 2017) - IMCCE, Observatoire de paris, Dynamical Systems group (July-August 2016) - Università di Napoli Federico II, dept. Mathematics (April 2016)

- **Habilitations:**

2016 - French National Qualification for Maître de conférences in Mathematics.

- **Institutional responsibilities:**

Since 2019 - Member of the Erasmus scientific board issuing scholarship for studying abroad, Univ. Roma Tre Dept. Mathematics

Since 2019 - Member of the scientific board for selecting Tutor and teaching assistants, Univ. Roma Tre, dept Science

- **Organization of Conferences & seminars:** - Co-Organizer of the weekly Dynamical Systems Seminars at Centro de Giorgi (SNS) - Member of the Organizing Committee for the conference Leaning Tori: a Hamiltonian Event under the Tower (Scuola Normale di Pisa, May 2019) - Member of the Organizing Committee for the conference Analysis and Dynamics (Patù, Oct. 2017)

- **Refereeing & other activities:**

- Referee for Lecture Notes in Mathematics (Springer), Journal of Mathematical Physics, Physica D, Non-Linear Analysis, Comm. in Pure and Applied Analysis, Nonlinear Differential Equations and Applications
- Referee member for the INdAM national competitive examination, issuing scholarships for students in Mathematics

- Invited contributor for the web page *Les mathématiques du ciel* (ENS Lyon & Musée des confluences) (<http://ens.tdaa.fr/dynamique-chaotique/pas-de-calcul/>)

- **Teaching activities:**

Measure Theory (12h exercices, 2020) Dept. Mathematics Univ. Roma Tre

Istituzioni di Matematiche (titolare) Dept. Science Univ. Roma Tre (70h course, since 2018)

Analysis 1 (72h course, 2016) Univ. Paris Dauphine, Bachelor in mathematics

Analysis 2 (72h course, 2015) Univ. Paris Dauphine, Bachelor in mathematics

Mathematical Methods for Physics, Master level (32h exercices, 2012 & 2013) Paris Observatory & Univ.

Paris 6

Applied Quantum Physics , Master level (32h exercises, 2012 & 2013) Paris Observatory & Univ. Paris 6  
 Geometry of Hamiltonian Systems, Master level (3h lecture, 2012) Paris Observatory

- **Attended Workshops, Colloquia and Advanced Courses**, among which:  
**Dynamical Systems: from geometry to mechanics** (2019) Workshop at Università di Roma Tor Vergata - **BeKAM international conference** (2018) Institut d'Etudes Scientifiques de Cargèse - **Recent advances in Hamiltonian dynamics and symplectic topology** (2018) University of Padova - **ETH-CSF Conference on Hamiltonian Dynamics**, (2017) conference in memory of John N. Mather. Ascona, Switzerland - **ETH-ITS Winter school in conservative dynamics** (2017)- **Mini-course on Arnold's diffusion** (December 2016) - **Hamiltonian Dynamics, PDEs and Waves on the Amalfi coast**, Maiori, Italy (2016) - **Workshop on interactions between dynamical systems and PDE's** (2016) Universitat Polytechnica de Catalunya, Barcelona - **Mini course "Variational methods in Hamiltonian systems"**(2015) By Ivar Ekeland, Université Paris-Dauphine - **Meeting of the ANR "Dynamique et EDP"** (2014) Centre d'Etudes Scientifiques, Cargèse - **Summer School in Dynamical Systems** (August 2014) University of Maryland, College Park, MD - USA - **International symposium "Dynamical Systems and PDE's"** November 2012 CIRM, Luminy, France - **Advanced School on Variational Methods on Vortex and N-body Dynamics** (June 2012) Università del Salento, Lecce, Italy - **International symposium "Dynamical optimisation in PDE's and Geometry, Applications to Hamilton-Jacobi and Weak K.A.M. Theory"** (2011)

## Description of research, results & perspectives

My research interests mainly lie in understanding the long term dynamics of Hamiltonian and non-Hamiltonian systems and in what it is now called "KAM theory". I am interested in the relations between spectral and dynamical properties of a Hamiltonian system and How do these properties behave under perturbations (see also the related project of research below).

Concerning the "KAM" interest, this theory, initiated by Kolmogorov in 1954 for finite-dimensional systems, has been extended also to the infinite-dimensional context in the 90's. It concerns with the study of the existence and the stability of invariant tori that are the support of *quasi-periodic* or *almost-periodic* motions of a given Hamiltonian system ( that is to say a superposition of finitely or infinitely many oscillatory motions of different frequencies) see at instance [12, 8, 6, 4, 11]. KAM theory plays a fundamental role in the study of conservative dynamical systems, as one encounters notably in Celestial and Classical Mechanics. This theory has been developed for general conservative systems, in particular for Hamiltonian ones; however, beyond the symplectic setting, it has a wide spectrum of applications in both finite and infinite dimensions: Hamiltonian PDEs, circle dynamics, holomorphic germs, theory of co-cycles...

The first generalization of KAM theory to non necessarily conservative systems is due to J. Moser in 1967, who established a normal form for real analytic perturbations of real analytic vector fields possessing a reducible, Diophantine invariant quasi-periodic torus; this normal form proved that the persistence of such an invariant torus is a phenomenon of finite co-dimension, which is due to the introduction in the perturbed system of some extra parameters (or counter-terms), in order to compensate its eventual *degeneracies*, such as absence of twist properties or Hamiltonian symmetries that usually make the general KAM-scheme work.

In the course of the 80-90's, many authors, among which Herman and Rüssmann at first, successfully exploited this idea of proving the finite co-dimension of a set of conjugacy classes of a vector field (idea which goes back to Arnold who at first proved a normal form for diffeomorphisms of  $\mathbb{T}^n$ , in 1963) to derive KAM-type results . In fact, this point of view allows to tackle the problem of the persistence of an invariant Diophantine torus in two steps:

1. prove a normal form which does not rely on any non-degeneracy condition (but containing the hard analysis)
2. show that the counter-terms can be *eliminated* by using internal or external parameters and convenient non-degeneracy assumptions (twist condition, symmetries...) satisfied by the system under analysis, through the application of the usual implicit function theorem: if the extra corrections vanish, then the perturbed systems under normal form possesses an invariant quasi-periodic torus.

The power of this "elimination of parameters" technique is highlighted in many works, among which we recall Herman-Féjóz's proof of "Arnold's theorem" on the KAM stability of the planetary  $N$ -body problem (a complete proof, including the torsion property, was obtained by Chierchia and Pinzari), Chenciner's study on the bifurcation of elliptic fixed points, or Eliasson-Fayad-Krikorian work around the stability of KAM tori.

Another important field, especially for applications, is the study of weakly dissipative systems, in particular **the study of the robustness of normally hyperbolic quasi-periodic tori in systems of weak-dissipative**

**regime.**

In order to study some generalization of KAM theory in this direction, part of my Ph.D thesis "Quasi-periodicity and quasi-conservativity", was devoted to investigate a class of systems, issued very naturally from Celestial Mechanics for example, that are Hamiltonian systems where a friction term is also plugged in and is allowed to vary, uniformly with respect to the perturbation, in a neighborhood containing the origin (as opposed to the general theory of normally hyperbolic invariant manifolds, where the normal dynamics must prevail over the perturbation to expect their persistence).

The starting point of this study is a short, new proof of Moser's aforementioned normal form theorem; the proposed approach, based on an inverse function theorem in analytic class, is flexible and can be adapted to several contexts. This allowed me to prove in a unified framework the persistence, up to finitely many parameters, of Diophantine quasi-periodic normally hyperbolic reducible invariant tori for both the above systems and, more in general, for generally perturbed systems where the Hamiltonian structure is completely absent. As a byproduct, generalizations of Herman's twisted torus theorem are given for vector fields belonging to these classes.

An example of application of these normal forms is the study of the persistence of quasi-periodic attractors in the spin-orbit problem of Celestial Mechanics, carried out by Celletti and Chierchia among others in the last few years; this study becomes a particular case of small dimension and its proof reduces to the direct application of a well suited translated-torus theorem and the implicit function theorem in finite dimension.

These results are presented in the paper *Normal forms for perturbations of systems possessing a Diophantine invariant torus* in Ergodic Theory and Dynamical System [10].

**A generalization of classical Rüssmann's translated curve theorem to higher dimensions.** The approach presented in the paper on ETDS, rose natural questions about possible generalizations in higher dimensions of the classical theorem of Rüssmann on the existence of a translated curve for non-conservative twist diffeomorphisms of the annulus close enough to twist maps that preserve a Diophantine circle (result which generalized Moser's invariant curve theorem for area-preserving twist mappings of the annulus).

By proving a normal form theorem for analytic perturbations of a diffeomorphism on  $\mathbb{T}^n \times \mathbb{R}^m$  having an invariant reducible quasi-periodic torus (a discrete time analogue of Moser's 1967 normal form, which turned out to be very useful), I was able to deduce a higher dimensional version of Rüssmann's theorem, for perturbation of diffeomorphisms satisfying some twist property and preserving a normally hyperbolic reducible Diophantine torus.

This result is contained in the paper *A normal form à la Moser for diffeomorphisms and a generalization of Rüssmann's translated curve theorem to higher dimensions*, published in Analysis & PDE [9].

**Towards a global understanding of the parameters space.** In the unified framework in which we proved the mentioned normal forms, the persistence result of Celletti-Chierchia is phrased as the existence of a Cantor set of curves in the parameters' space of the spin-orbit system, corresponding to those values of parameters for which attractive quasi-periodic tori survive. The normal hyperbolicity of these invariant tori guarantees their robustness: for values of the parameters belonging to a cone neighborhood of this set of curves, invariant tori still exist for the system. Of course, the dynamics on the tori is no more controlled and may be generic.

In the preprint *"Normally hyperbolic invariant tori via elliptic methods: an example"*, we determine quantitatively such a cone neighborhood by using the fact that close to the set of curves, we are able to apply a well suited version of Rüssmann's translated curve theorem (given in the paper on Anal.&PDE) in order to construct local coordinates of the type (dissipation, translation), similar to the ones introduced by Chenciner in his work on the bifurcations of elliptic fixed points (1985). Surprisingly, we are able to define these "regions of robustness" up to an order of dissipation which is as small as the perturbation.

This work is in progress: what kind of phenomena take place in the complementary of these neighborhoods? Some considerations in this study hint the existence of Birkhoff attractors, as well as invariant sets of Aubry-Mather. The portrait given by Chenciner in his series of three papers (1985-1988) in generic co-dimension 2 is extremely vast. Hence one can expect a similar richness of dynamical behaviors to be present in the systems we study.

**Almost-periodic tori for the non-linear Schrödinger equation (with L. Biasco & M. Procesi), - Gevrey regularity** In the work "Almost periodic invariant tori for the NLS on the circle," accepted for publication on Ann. Inst. H. Poincaré, Analyse nonlinéaire, we investigate in Gevrey category, the problem of existence of almost-periodic solutions for the NLS. Motivated by the major impact of these counter-terms techniques in the study of finite dimensional dynamical systems, we naturally extend this approach also in infinite dimension.

Inspired by the classical "twisted conjugacy theorem" of M. Herman for perturbations of degenerate Hamiltonians possessing a Diophantine invariant torus, we studied in a more general context the problem of existence

of invariant tori of *(full) infinite* dimension (almost-periodic solutions) for the NLS on the circle. So far, in the context of PDEs, very few results are known in this direction, mainly by Bourgain and Pöschel, and all of them lay on models with external parameters. In the work "*Almost-periodic tori for the NLS on the circle*" we weaken the hypothesis of Bourgain's result and prove the persistence of invariant full dimensional Diophantine tori for NLS Hamiltonians of Gevrey regularity, which **do not** preserve momentum; the existence of such a torus for the NLS system comes as the byproduct of an abstract and flexible normal form theorem "à la Herman", which may be applied also to other kind of PDEs. The breakthrough of such a technique (with respect to the approach of Pöschel) is the control on small divisors (hence smallness conditions) through bounds which are *independent* of the dimension of the torus; this scheme allows, for the first time, to handle in the same way the problem of existence of elliptic tori either of finite or infinite dimension.

- **Sobolev category** Of course a big and interesting but very challenging problem was to prove such results in the case of Sobolev regularity; in this line of thought, an intermediate but still big step would be to prove it in the case of infinite but non maximal tori. In fact we achieved in this context in proving the existence of almost-periodic non-maximal tori.

The final goal of this research would be to prove the existence of almost-periodic solution in systems *without external parameters*.

**An Abstract Birkhoff Normal Form Theorem and Exponential Type Stability of the 1d NLS (with L. Biasco & M. Procesi)** In this work, published on Comm. Math. Physics, 2019, we recover and improve existing results on the stability à la Nekhoroshev for the solutions of the NLS (Bambusi-Grébert 2006 and Grébert-Faou 2013), giving quantitatively explicit exponential and sub-exponential time estimates in the Sobolev and Gevrey class respectively. The main tools of our method are a suitable Diophantine condition together with the generalization of some lemmas on small divisors first introduced by Bourgain, and fundamental monotonicity properties enjoyed by our norm, with respect to the introduced indexes (sub-analyticity and Sobolev in particular). In this functional frame it is possible to proceed similarly to the classical finite dimensional case, this allows us to give a rather abstract presentation and very precise estimates. For the main statements, see also "*Exponential and sub-exponential stability times for the NLS on the circle*", (with L. Biasco and M. Procesi), to appear in Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl. (2018).

## COLLABORATIONS AND PERSPECTIVES

### Flexibility and analytic smoothing in averaging theory (with S. Barbieri, & J.-P. Marco)

Based on classical Nekhoroshev's estimates, we develop an effective result of stability for quasi-convex, near-integrable hamiltonian systems of Hölder regularity over times which are polynomially long in the inverse of the size of the perturbation. Such result is obtained by following a different strategy than it is usually done in these cases: instead of constructing perturbation theory in Hölder class, we make use of classical analytic averaging theorems and we exploit a sharp analytic smoothing theorem in order to approximate any Hölder function with an analytic one. Moreover, an appropriate choice of the free parameters in such problem allows to understand the deep relation connecting the time of stability to the threshold that the size of the perturbation must satisfy in order for the theorem to apply.

**On the rigidity of integrable deformations of twist maps and Hamiltonian flows (with A. Sorrentino)** While the conservation of irrational tori holds generically and has been deeply studied over the last fifty years the study of the conservation of resonant ones (the most fragile) may give more information: if a family of (perturbed) twist maps or flows preserve an appropriate set of rational tori, this imply some constraints on the allowed perturbations. In this work we prove some rigidity results for a family of Tonelli Hamiltonians and of perturbed integrable twist maps of standard type.

**Competition between general dissipation and symplectic structure (with B. Fayad).** The main ingredient of the persistence result for quasi-periodic attractors in the work of Celletti-Chierchia and Stefanelli-Locatelli (2012) on the spin-orbit problem is the particular form of the friction term appearing in the system of equations. This class of vector fields being stable under symplectic transformations, one can work out a scheme as in the usual Hamiltonian framework and give a smallness condition for the persistence of attractive tori which is uniform with respect to the dissipation constant.

In a joint work with Bassam Fayad, we push further the study of an  $n$ -parameter family of spin-orbit type systems with more general dissipation. We build up a hybrid KAM scheme that allows to handle separately the Hamiltonian terms and the non-Hamiltonian ones and maintain a smooth control of the solutions with respect to both dissipation and external frequencies.

**Global linearization of holomorphic germs (with S. Marmi)** We prove a rigidity result for holomorphic germs in the neighborhood of the origin in  $\mathbb{C}$  which are conjugated to the their linear part  $\lambda z$ , for any  $\lambda$  in some open arc of  $\mathbb{S}^1$ .

## ON THE REASEARCH PROJECT "Spectral and dynamical properties of Hamiltonian systems"

As Principal Investigator, I will coordinate the research and collaborate with my group members P. Baldi, E. Haus, V. Morinelli, M. Procesi, and A. Sorrentino on the transversal line of this project.

We aim to investigate some interesting problems at the crossroads of analysis, dynamical systems and geometry. One of the leitmotiv is the following: *What are the relations between spectral and dynamical properties of a Hamiltonian system? How do these properties behave under perturbations?*

There are many notions of *spectrum*, according to the context that one is considering.

- In Hamiltonian and symplectic dynamics an important notion is the one of *action spectrum*, namely the integral of the primitive of the symplectic form on the closed (*i.e.*, *periodic*) orbits of the systems. This object – which has been extensively investigated over the last years – encodes many interesting dynamical information and, stunningly, occurs in many different contexts; for example:
  - *Minimal average actions* (the so-called Mather's  $\alpha$  and  $\beta$  functions) in the case of Tonelli Hamiltonian systems, see for example [21, 24].
  - *Homogenized Hamiltonian*, which appears in the study of the Hamilton-Jacobi equation and its viscosity solutions [15].
  - *The length spectrum* in Riemannian geometry and billiard dynamics related to the lengths of closed geodesics and billiard's periodic orbits. The length spectrum of a billiard in a domain shares a remarkable relation with the Laplace spectrum on the domain [1].
- In a related context, the notion of spectrum is a prominent feature in *KAM theory*, both in finite and infinite dimension. A key-point in this study of the dynamics in a neighborhood of these objects, consists in controlling spectral properties of appropriate linear operators and in dealing with the so-called *small divisor problem*, which requires quantitative bounds on the difference of their eigenvalues, under suitable arithmetic properties. Of course, the eigenvalues of such linear operators, change drastically depending on which system we are dealing with and studying their stability turns out to be very challenging. A byproduct of this spectral analysis is the so-called problem of *reducibility*: namely, to understand whether the dynamics in the normal direction of these quasi-periodic invariant tori can be conjugated to a trivial one (see [9, 10, 13]).

These notions are intimately related one another and can be thought as different facets of a more global picture, that still waits to be better understood. Various steps in this direction have been recently achieved. To mention a few of them: in [20] regularity properties of minimal average actions have been related to the existence of invariant Lagrangian submanifolds, KAM tori and to the integrability of the system. In [19] the authors studied, in a special setting, how the minimal average action determines the system and prove a rigidity results for perturbations of integrable twist maps. The relation between Mather's minimal average action and Homogenization of Hamilton-Jacobi equation, became evident after Fathi's work on weak KAM theory [15], and since then much more light has been shed. In [16] this point of view was used to show uniqueness results for KAM tori with respect to their dynamical properties.

In the frame of this project we are focusing on three main axes:

- *Spectral analysis & Reducibility*: investigate to more general cases the study started in [19, 9, 10] and to extend it to a larger class of nearly-integrable systems. This analysis will be then applied to study the rigidity of Riemannian integrable geodesic flows on a torus and to investigate spectral and dynamical properties of higher dimensional billiards, in the same spirit as in [17, 18].
- *Spectral properties of infinite dimensional systems and Hamiltonian PDEs*:  
So far the analysis of the action spectrum and its connection to the study of Hamiltonian dynamics, has been mostly investigated in the finite dimensional setting, while a general theory for its infinite dimensional counterpart is still missing. We aim to understand how much can be generalized to this context, by starting from some special example of Hamiltonian PDE. For instance, the nonlinear Schrödinger equation (NLS) seems to be a good candidate: we plan to exploit much of the information provided by the KAM analysis carried out in [5, 6, 2, 3].
- *Almost-periodic tori*: Pushing forward the analysis started in [3], we wish to investigate the existence of almost-periodic tori without external parameters; this requires, among other things, defining a suitable notion of infinite dimensional version of angle-action variables and their relation to the classical approach à la Arnold-Liouville.



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### Education

- May 2008, **Ph.D. in Mathematics**, University Paris-Est Marne-la-Vallée, France & University Roma III, Italy.
- February 2004, **M.S. in Mathematics**, University of Pisa, Italy.
- April 2001, **M.S. in Electronic Engineering**, University of Reggio Calabria, Italy.

### Research interests

Differential geometry, geometric analysis, differential equations on manifolds.

### Publications

1. *Index and nullity of the Gauss map of the Costa-Hoffman-Meeks surfaces*, **Indiana University Mathematics Journal**, Vol. 58, 2, 2009, 677-707.
2. *An end-to-end construction for singly periodic minimal surfaces* (with L. Hauswirth and M. M. Rodríguez), **Pacific Journal of Mathematics**, Vol. 241, No. 1, 2009, 1-61.
3. *About a family of deformations of the Costa-Hoffman-Meeks surfaces*, **Bulletin of the Brazilian Mathematical Society**, Vol. 40(3), 2009, 433-454.
4. *A Costa-Hoffman-Meeks type surface in  $H^2 \times R$* , **Transactions of the American Mathematical Society**, Vol. 363, No. 1, 2011, 1-36.
5. *Saddle Towers and minimal  $k$ -noids in  $H^2 \times R$*  (with M. M. Rodríguez), **Journal de l'Institut de Mathématiques de Jussieu**, vol. 11 (2), 2012, 333-349.



6. *Non-periodic Riemann examples with handles*, (with M. Traizet), **Advances in Mathematics**, 229, 2012, 26-53.
7. *Classification of special rotational Weingarten surfaces of minimal type in  $S^2 \times R$  and  $H^2 \times R$*  (with M. M. Rodríguez), **Mathematische Zeitschrift**, 273, 379-399, 2013.
8. *Height estimate for special Weingarten surfaces in  $M^2(c) \times R$* , **Proceedings of the American Mathematical Society**, Series B, 1, 14-22, 2014.
9. *Higher genus capillary surfaces in the unit ball of  $R^3$* , **Boundary Value Problems**, 130, 2014.
10. *Radial and non-radial solutions to an elliptic problem on annular domains in Riemannian manifolds with radial symmetry*, **Journal of Differential Equations**, 258, 1461-1493, 2015.
11. *Singly periodic free boundary minimal surfaces in a solid cylinder of  $R^3$* , **Discrete Continuous Dynamical Systems, Series A**, 35, n. 10, 4987-5001, 2015.
12. *Delaunay type domains for an overdetermined elliptic problem in  $S^n \times R$  and  $H^n \times R$* , (with P. Sicbaldi), **ESAIM Control, Optimisation and Calculus of Variations**, 22, n. 1, 1-28, 2016.
13. *Free boundary surfaces and saddle tower minimal surfaces in  $S^2 \times R$* , **Journal of Mathematical Analysis and Applications**, 443, 478-525, 2016.
14. *Asymptotically radial solutions to an elliptic problem on expanding annular domains in Riemannian manifolds with radial symmetry*, **Boundary Value Problems**, 124, 2016.
15. *Symmetry breaking bifurcations for an overdetermined boundary value problem on an exterior domain issued from electrodynamics*, **Nonlinear Analysis**, 158, 1-22, 2017.
16. *Towering phenomena for the Yamabe equation on symmetric manifolds*, (with A. Pistoia, G. Vaira), **Potential Analysis**, 47, n. 1, 53-102, 2017.
17. *Bounded and unbounded capillary surfaces derived from the catenoid*, **Discrete Continuous Dynamical Systems, Series A**, 38 n.2, 589-614, 2018.
18. *Singly periodic free boundary minimal surfaces in a solid cylinder of  $H^2 \times R$* , **Nonlinear Analysis**, 171, 208-237, 2018.
19. *Periodic minimal surfaces embedded in  $R^3$  derived from the singly periodic Scherk minimal surface*, **Communications in Contemporary Mathematics**, 22, 1, 2020, 1850075.

## Submitted articles

1. *Periodic free boundary minimal surfaces embedded in a slab of  $R^3$* , submitted to **Journal of Differential Equations**.
2. *Symmetry breaking bifurcations for two overdetermined boundary value problems with non-constant Neumann condition on exterior domains in  $R^3$* , submitted to **Communications in Partial Differential Equations**.

Excellent paper award, College of Science, KAIST, December 2014 and December 2015.

Referee for Bulletin of Brazilian Mathematical Society, Geometry and Topology, Transactions of the American Mathematical Society, Transformation groups, Pacific Journal of Mathematics, Communications on Pure and Applied Analysis.

## **Taught courses**

At Université Paris-Est

2007/08, Linear Algebra, Analysis 2, Calculus and integration;

2008/09, Calculus in Banach spaces, Introduction to mathematical thinking, Linear Algebra;

At Korea University

2012, Fall semester: Calculus I, Differential Geometry (Graduate);

2013, Spring semester: Ordinary differential equations, Riemannian Geometry (Graduate);

At KAIST

2013, Fall semester: Combinatorial Topology, Complex Function Theory (Graduate);

2014, Spring semester: Calculus I, Riemannian Geometry (Graduate);

2014, Fall semester: Calculus II, Differential Geometry (Graduate);

2015, Spring semester: Calculus I, Analysis on Manifolds;

2015, Summer semester: Individual study course;

2015, Fall semester: Differential Geometry (Graduate);

2016, Spring semester: Matrix Groups, Riemannian Geometry (Graduate);

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2017, Fall semester: Differential Geometry (Graduate);

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## **Employment**

09/2017 - 08/2020 **Associate Professor**

Department of Mathematical Sciences, KAIST, Daejeon, South Korea.

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School of Mathematics, KIAS Korea Institute for Advanced Study, Seoul, South Korea.

09/2013 - 08/2017 **Assistant Professor**

Department of Mathematical Sciences, KAIST, Daejeon, South Korea.

09/2012 - 08/2013 **Assistant Professor (non tenure track)**

Department of Mathematics, Korea University, Seoul, South Korea.

09/2010 - 08/2012 **Research fellow**

School of Mathematics, KIAS Korea Institute for Advanced Study, Seoul, Korea.

12/2009 - 08/2010 **Post-doc CNRS**

Laboratoire de Mathématiques et Physique Théorique, Université de Tours, France.

09/2009 - 11/2009 **Invited researcher**

Instituto de Matemáticas Interdisciplinar, Universidad Complutense de Madrid, Spain.

09/2008 - 08/2009 **ATER**

Université Paris-Est Marne-la-Vallée, France.

09/2007 - 08/2008 **ATER**

Université Paris-Est Marne-la-Vallée, France.

### **Sabbatical leave**

ICTP, International Centre for Theoretical Physics, 01/09/2019 - 07/05/2020.

### **Grants**

2016, extension of the Grant by National Research Foundation (South Korea). Supported project: Overdetermined boundary value problems in Riemannian manifolds. Amount: 80,000,000 won.

2013, Grant by National Research Foundation (South Korea). Supported project: Overdetermined boundary value problems in Riemannian manifolds. Amount: 82,000,000 won.

2011, Grant for Scientific Collaboration Hubert Curien by Egide (Paris, France) in South Korea (with J. Choe, B. Daniel, L. Hauswirth).

2006, Grant by Université Franco-Italienne for doctoral students enrolled in two Ph.D. Programs (in a French university and in an Italian university) simultaneously.

### **Invitations**

Université Aix-Marseille, France (3 times, average length of the stay: 30 days);

Université Paris-Est Marne-la-Vallée, France, 26 days;

Université de Tours, France, 20 days;

Università Roma "Sapienza", Italy, 7 days.

### **Talks**

- *Minimal surfaces in  $H^3$* , February 2020, ICTP, Trieste, Italy.
- *Two overdetermined boundary value problems with non-constant Neumann condition on exterior domains in  $\mathbb{R}^3$* , July 2018, KIAS, Seoul, Korea.
- *Asymptotically radial solutions to an elliptic problem on expanding annular domains in Riemannian manifolds with radial symmetry*, July 2018, 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Taipei, Taiwan.
- *Delaunay type domain for an overdetermined elliptic problem in  $H^n \times \mathbb{R}$  and  $S^n \times \mathbb{R}$* , November 2017, 2nd Pan Pacific International Conference on Topology and Applications, Busan, South Korea.
- *Periodic minimal surfaces embedded in  $\mathbb{R}^3$  derived from the singly periodic Scherk minimal surface*, June 2017, PDE's Seminar, KAIST, Daejeon, Korea.

- *Extremal domains for the first eigenvalue in a general compact Riemannian manifold*, December 2016, Geometry Workshop, Yong Pyong, Korea.
- *Introduction to minimal surfaces theory*, December 2016, Symposium Korea-Italy on Mathematics, KAST and Accademia dei Lincei, KIAS, Seoul, Korea.
- *Symmetry breaking bifurcations for an overdetermined problem on an exterior domain*, November 2016, PDE's Seminar, KAIST, Daejeon, Korea.
- *An overdetermined problem on an exterior domain*, July 2016, KIAS, Seoul, Korea.
- *Capillary and free boundary surfaces obtained by deformation of minimal surfaces*, Asymptotic problems: elliptic and parabolic issues, June 2015, Vilnius, Lithuania.
- *Higher genus capillary surfaces in the unit ball of  $R^3$* , November 2014, KIAS, Seoul, Korea.
- *Costa-Hoffman-Meeks surfaces*, November 2014, KIAS, Seoul, Korea.
- *Splitting Theorems, Symmetry Results and Overdetermined Problems for Riemannian Manifolds*, April 2014, KIAS, Seoul, Korea.
- *From constant mean curvature surfaces to overdetermined elliptic problems*, March 2014, Colloquium, Dept. Mathematical Sciences, KAIST, Daejeon, Korea.
- *From Constant mean curvature surfaces to overdetermined elliptic problems*, March 2014, Geometry Seminar, Pusan University, Pusan, Korea.
- *Delaunay type domains for an overdetermined elliptic problem*, October 2013, Annual meeting of Korean Mathematical Society, Seoul, Korea.
- *Higher genus capillary surfaces in a unit ball of  $R^3$* , October 2013, Colloquium, Dept. Mathematical Sciences, KAIST, Daejeon, South Korea.
- *Delaunay type domains for an overdetermined elliptic problem*, April 2013, KIAS, Seoul, South Korea.
- *Overdetermined problems in Riemannian manifolds*, February 2013, KAIST, Daejeon, South Korea.
- *Construction of minimal surfaces in riemannian manifolds*, October 2012, University of Laval, Québec, Canada.
- *Non-periodic Riemann type surfaces with handles*, October 2012, Annual meeting of Korean Mathematical Society, Daejeon, Korea.
- *Construction of minimal surfaces in riemannian manifolds*, August 2012, University of Surrey, Guildford, United Kingdom.
- *Surfaces of Costa-Hoffman-Meeks type in  $H^2 \times R$* , September 2011, Summer school in Partial Differential Equations, Caputh, Germany.
- *Gluing technique in minimal surfaces theory*, July 2011, Geometry seminar, Korea Institute for Advanced Study, Seoul, Korea.
- *Higher genus minimal surfaces in  $R^3$  with infinitely many parallel planar ends*, May 2011, Differential Geometry Workshop, Ewha Woman's University, Seoul, Korea.
- *Classification of rotational special Weingarten surfaces of minimal type in  $H^2 \times R$  and  $S^2 \times R$* , November 2010, Geometry seminar, Korea Institute for Advanced Study, Seoul, Korea.

- *Construction of new examples of minimal surfaces in  $R^3$  with infinitely many horizontal planar ends*, November 2010, Instituto de Matematica Pura e Aplicada, Rio de Janeiro, Brazil.
- *New examples of minimal surfaces in  $H^2 \times R$* , October 2010, Geometry seminar, Korea Institute for Advanced Study, Seoul, Korea.
- *On a family of complete embedded minimal surfaces in  $R^3$  with infinitely many horizontal planar ends*, July 2010, 5th Workshop of Differential Geometry, Korea Institute for Advanced Study, Seoul, Korea.
- *Saddle towers dans  $H^2 \times R$* , May 2010, Séminaire de Géométrie, Institut de Mathématiques de Jussieu, Paris.
- *Saddle towers dans  $H^2 \times R$* , February 2010, Séminaire de Géométrie, Laboratoire de Mathématiques et Physique Théorique, Université de Tours, France.
- *Surfaces of Costa-Hoffman-Meeks type in the space  $H^2 \times R$* , September 2009, Workshop de Jovenes Investigadores, Facultad de Matemáticas, Universidad Complutense de Madrid, Spain.
- *Index and Nullity of the Gauss map of the Costa-Hoffman-Meeks surface*, May 2008, Giornate di Geometria Algebrica e argomenti correlati, Levico Terme, Italy.
- *Surfaces of Costa-Hoffman-Meeks type in the space  $H^2 \times R$* , May 2008, Geometry Seminar, Departamento de Geometría y Topología of the University of Granada, Spain.
- *Surfaces de type Costa-Hoffman-Meeks dans l'espace  $H^2 \times R$* , January 2008, Séminaire de Géométrie, Institut de Mathématiques de Jussieu, Paris.

## References

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## Conferences and schools

*Summer school in Semiclassical Analysis*, 29 July - 16 August 2019, Northwestern University, Evanston, USA.

*Microlocal Analysis and Applications*, 14-21 June 2019, Shanghai, China.

*Young PDE's @ Rome*, 19-22 February 2018, Roma, Italia.

*Geometric Inequalities on Riemannian Manifolds and related topics*, 23-26 November 2016, Busan, South Korea.

*Equadiff 2015*, 6-10 July 2015, Lyon, France.

*Asymptotic problems: elliptic and parabolic issues*, 1-5 June 2015, Vilnius, Lithuania.

*Variational methods for Non-linear PDE's, ICM Satellite Conference*, 4-8 August 2014, KAIST.

*9th KIAS Summer School on Differential Geometry*, 23-27 June 2014, South Korea.

*Winter School in Geometric PDE's*, 02-13 July 2012, University of Queensland, Brisbane, Australia.

*School and Conference on Geometric Analysis*, 11-29 June 2012, ICTP, Trieste, Italy.

*6th KIAS Winter School on Differential Geometry*, 6-10 February 2012, South Korea.

*Summer school in Partial Differential Equations*, 12-16 September 2011, Caputh, Germany.

*Ricci Solitons Days in Pisa 2011*, 4-8 April 2011, Pisa, Italy.

*Submanifold theory and applications*, 28 March - 2 April 2011, Sevilla, Spain.

*Recent Developments in Nonlinear Partial Differential Equations: Part I*, 28 Feb - 4 Mar 2011, Hong Kong.

*Algebraic, geometric and analytic aspects of surface theory*, 5-10 April 2010, Buzios, Brazil.

*School of Differential Geometry*, 9-13 June 2008, International Centre for Theoretical Physics, Trieste, Italy.

*Ricci curvature and complex geometry*, during the trimester about "Ricci curvature and Ricci flow" organized at Institut Henri Poincaré, 2-6 June 2008, Paris.

*Introduction to Ricci curvature*, by Sylvestre Gallot (Université de Grenoble), during the trimester about "Ricci curvature and Ricci flow" organized at the Institut Henri Poincaré, 14-25 April 2008, Paris.

*Constant mean curvature and minimal surfaces international congress*, 20-25 August 2007, Buzios, Brazil.

*Géométrie et EDP*, 18-22 June 2007, C.I.R.M., Luminy, France.

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## »»» Employment history

- |                 |  |   |
|-----------------|--|---|
| Mar '20-Feb '21 | <b>Postdoctoral Researcher</b>   | "Tor Vergata" Univ. of Rome                   |
|                 | » postdoc for the Roberto Longo ERC advanced grant "Quantum Algebraic Structures and Models".  |   |
| Mar '19-Feb '20 | <b>Postdoctoral Researcher</b>   | INdAM (Istituto Nazionale di Alta Matematica) |
|                 | » collaboration postdoc fellowship provided by <b>INdAM, the National Institute for High Mathematics</b> . My research project "Operator algebraic aspects of Quantum Field Theory" is 2 <sup>nd</sup> ranked on the call. Host Institution: "Tor Vergata" Univ. of Rome |   |
| Mar 16-Feb '19  | <b>Postdoctoral Researcher</b>   | "Tor Vergata" Univ. of Rome                   |
|                 | » postdoc for the Roberto Longo ERC advanced grant "Quantum Algebraic Structures and Models"; from 01/03/2018 supported by the program MIUR FARE R16X5RB55W.   |   |

## »»» Education

- |                |   |                             |
|----------------|---|-----------------------------|
| Dec 15th, 2015 | <b>Ph.D. in Mathematics</b>   | "Tor Vergata" Univ. of Rome |
|                | » <b>Thesis:</b> "On the Bisognano-Wichmann Property, Nuclearity and Particle Localization", Advisor: Prof. Roberto Longo.  |                             |
| Jul 18th, 2012 | <b>Master's degree in Mathematics</b>   | "Roma Tre" Univ. of Rome    |
|                | » Final Mark: 110/110 cum Laude   |                             |
|                | » <b>Thesis:</b> "The Semilinear Klein-Gordon Equation in two and three space dimensions", Advisor: Prof. Giovanni Mancini. |                             |
| Jul 15th, 2010 | <b>Bachelor's degree in Mathematics</b>   | "Roma Tre" Univ. of Rome    |
|                | » Final Mark: 110/110 cum Laude   |                             |

## »»» Fields of interests

My **research interests** concern *Functional Analysis*, *Operator Algebras* and its applications to *Relativistic Quantum* systems with infinitely many degrees of freedom. My research centrally involves further topics as *Operator Theory*, (*compact and locally compact*) *Group Representation Theory*, Lie algebra/group theory, *Wavelet Theory*, Subfactor theory. Moreover part of my research is deeply related with *Entropy in Quantum Information*. *Partial differential equations*, in particular elliptic and hyperbolic equations, are also part of my background (referring to undergraduate studies, cf. master thesis).

I am also interested in **science communication** (see additional information section).

## Scientific Contributions:

My research concerns the relation between geometric and algebraic properties in the operator algebraic approach to QFT. The Haag-Kastler axioms describe (continuum) infinite degrees of freedom systems respecting basic quantum and relativistic assumptions. In brief, models are defined axiomatically by algebras of bounded operators (observables) on an infinite dimensional Hilbert space, associated to regions of the spacetime (Minkowski,  $S^1$ -chirality) undergoing a covariant action of the symmetry group (Poincaré, Möbius, Diffeomorphisms...). They further commute when they are spacelike separated (locality).

### My scientific contributions:

- Solution of a long standing problem on infinite spin representations localization property (Paper 1)  
*We study the (non-)dilation covariance of infinite spin Poincaré representations to conclude the absence of local algebras*  
with R. Longo (Univ. Tor Vergata) and K.-H. Rehren (Univ. Göttingen)
- An algebraic sufficient condition for the Bisognano-Wichmann property (Paper 2,4)  
*I introduce new algebraic condition on the Poincaré covariant representation that ensures an identification of algebraic and geometric objects/symmetries.*
- Split Property for conformal field theories (Paper 3)  
*Existence of product state (statistical independence) for local positive-spacelike separated von Neumann algebras under conformal symmetry assumption*  
with Y. Tanimoto (Univ. Tor Vergata) and M. Weiner (BME).
- Dilation covariance imply Möbius covariance in 1+1 spacetime dimension (Paper 5)  
*Algebraic structure of von Neumann algebra (Tomita operators) allows a larger symmetry group: from Poincaré + Dilation to conformal (Möbius) symmetries*  
with Y. Tanimoto (Univ. Tor Vergata)
- Split Property for free massless finite helicity fields (Paper 6)  
*Existence of conformal subtheories ensure the existence of product states (statistical independence) for positive-spacelike separated local von Neumann algebras*  
with R. Longo (Univ. Tor Vergata), F. Preta (NYU), K.-H. Rehren (Univ. Göttingen)
- Bisognano-Wichmann property in massless interacting theory (Publication 7)  
*Identification of geometric and algebraic objects in general QFT (possibly interacting); breakthrough technique based on Publication 4.*  
with W. Dybalski (TU München)
- New algebraic constructions in QFT Publication 8)  
*New constructions and relations between Poincaré representations and free QFT obtained by deforming Lie generators*  
with K.-H. Rehren (Univ. Göttingen)
- Scaling limit and operator-algebraic renormalization procedure (preprint 1, a review on the paper in preparation 1.)  
*We provide a rigorous operator algebraic procedure for the lattice scaling limit to the continuum which applies to the free field. A central role in the lattice approximation is covered by wavelets and scaling functions* with G. Morsella, A. Stottmeister, Y. Tanimoto

## Ongoing projects topics:

- Algebraic sufficient condition for the Bisognano-Wichmann property, Modular covariance in Quantum Field Theory.
- Nuclearity and compactness conditions on superselection sectors, namely for the representation theory of chiral theories.
- Modular covariance on Lie group and for general interacting theories  
in part with K.-H. Neeb (Univ. Erlangen-Nürnberg) and W. Dybalski (TU München)
- Scaling limit on lattice Quantum field theory  
with A. Stottmeister (Univ. Münster) (Univ. Münster), Gerardo Morsella and Yoh Tanimoto (Univ. Tor Vergata)
- Entropy and Tomita modular theory in QFT  
in part with R. Longo (Univ. Tor Vergata) and G. Lechner (Univ. Cardiff)
- Blackhole entropy for Kerr spacetime  
with A. Stottmeister (Univ. Münster), N. Pinamonti (Univ. Genova)



## Publications:

### Published:

1. R. Longo, V. Morinelli, K.-H. Rehren, *Where Infinite Spin Particles Are Localizable*, Commun. in Math. Phys., Volume 345, Issue 2, pp 587–614 (2016).  
<https://doi.org/10.1007/s00220-015-2475-9>
2. V. Morinelli, *An algebraic condition for the Bisognano-Wichmann Property*, Proceedings of the 14th Marcel Grossmann Meeting - MG14, Rome pp. 3849-3854 (2017)  
[https://doi.org/10.1142/9789813226609\\_0509](https://doi.org/10.1142/9789813226609_0509)
3. V. Morinelli, Y. Tanimoto, M. Weiner, *Conformal covariance and the split property* Commun. Math. Phys. Volume 357, Issue 1, pp 379–406 (2018).  
<https://doi.org/10.1007/s00220-017-2961-3>
4. V. Morinelli, *The Bisognano-Wichmann property on nets of standard subspaces, some sufficient conditions*, Ann. Henri Poincaré, Volume 19, Issue 3, 937–958 (2018).  
<https://doi.org/10.1007/s00023-017-0636-4>
5. V. Morinelli, Y. Tanimoto, *Scale and Möbius covariance in two-dimensional Haag-Kastler net*, Commun. in Math. Phys. Vol 371, Issue 2, pp 619–650 (2019)  
<https://doi.org/10.1007/s00220-019-03410-x>
6. R. Longo, V. Morinelli, F. Preta, K.-H. Rehren, *Split property for free finite helicity fields*, Ann. Henri Poincaré, Volume 20, Issue 8, pp 2555-2258 (2019).  
<https://doi.org/10.1007/s00023-019-00820-4>
7. W. Dybalski, V. Morinelli, *Bisognano-Wichmann property for asymptotically complete massless QFT*, Commun. in Math. Phys. (2020) - *In press*  
<https://doi.org/10.1007/s00220-020-03755-8>
8. V. Morinelli, K.-H. Rehren, *Spacelike deformations: Higher-helicity fields from scalar fields*, Lett. in Math. Phys. (2020) - *In press*  
<https://doi.org/10.1007/s11005-020-01294-w>

### Preprint:

1. A. Stottmeister, V. Morinelli, G. Morsella, Y. Tanimoto, *Operator-algebraic renormalization and wavelets*<sup>1</sup>  
<https://arxiv.org/abs/arXiv:2002.01442> (2020) (submitted to a scientific journal)

### In preparation:

1. V. Morinelli, G. Morsella, A. Stottmeister, Y. Tanimoto, *Scaling limit and operator-algebraic renormalization* (expected 2020)
2. V. Morinelli, and K.-H. Neeb, *Covariant homogeneous nets of standard subspaces* (expected 2020)

## Involvement in funding research projects:

- June 15th, 2016 - December 15th, 2017: participating in the research project: Ricerca Scientifica di Ateneo, Consolidate the Foundations - *Operator Algebraic Structures in Noncommutative Geometry*.
- December 1st, 2019 - June 1st, 2021: participating in the research project: Ricerca Scientifica di Ateneo, Beyond Borders - *Interaction of Operator Algebras with Quantum Physics and Noncommutative Structure*

## Student supervision

- Benedikt Wegener, (INdAM Cofund, Univ. Roma Tor Vergata, Advisor: Prof Roberto Longo), **Ph. D. Student**, Ongoing
- Francesco Preta, (Univ. Roma Tor Vergata, Advisor: Prof. Roberto Longo), **M. sc.** 2015- Joint paper on Annales Henri Poincaré. Now he is Ph.D. student at New York University (NYU), Courant Institute of Mathematical Sciences.
- Francesco Bonesi (Univ. Roma Tor Vergata, Advisor: Prof. Roberto Longo), **M.Sc.** 2014 (unofficially), Stefania Romani (Univ. Roma Tor Vergata, Advisor: Prof. Gerardo Morsella), **M.Sc.** 2013 (unofficially)

<sup>1</sup>the contribution of the authors have to be considered equal. Alexander Stottmeister is the corresponding author.

## »»» Services

- **Referee** for Communication in Mathematical Physics, Annales Henri Poincaré, Nuclear Physics B.
- **Reviewer** for Mathematical Reviews of AMS.

## »»» Organization of international conferences

- 43rd LQP workshop "Foundations and Constructive aspects of QFT" Galileo Galilei Institute Firenze (Italy) February 20-22, 2019.  
**Webpage:** <https://sites.google.com/view/43-lqp>

## »»» Some special events I took part:

1. May 2-8, 2014, spring school: "NCGOA Spring Institute 2014, Subfactors, CFT and VoA", Department of Mathematics, **Vanderbilt University, Nashville, Tennessee, USA**.
2. March, 22-28, 2015, workshop: "Subfactors and Conformal Field Theory", **Oberwolfach**, Germany.
3. July 12-18, 2015 "**14th Marcel Grossmann Meeting**" Rome, Italy.  
**Invited talk:** "Where Infinite Spin Particles Are Localizable" ("QF3 - Operator Algebras and Quantum Field Theory" session)
4. February 8-14, 2017, "Operator Algebras: Subfactors and their Applications" programme, Isaac Newton Institute, **Cambridge**, UK.  
**Invited talk:** "Conformal covariance and the split property".  
<http://www.newton.ac.uk/seminar/20170209140015002>
5. June, 17-22, 2019, Participation to the program at **the Simons Center for Geometry and Physics Program: Operator Algebras and Quantum Physics**, State University of **New York, Stony Brook (USA)**.  
**Invited talk:** Scale and Möbius covariance in two-dimensional Haag-Kastler net.  
[http://scgp.stonybrook.edu/video\\_portal/video.php?id=4176](http://scgp.stonybrook.edu/video_portal/video.php?id=4176)
6. July 10, 2020, **Colloquium** "Mathematical Physics Regensburg-Munich", LMU and TU Munich.  
**Invited talk:** "Covariant homogeneous nets of standard subspaces".

### Next events I will join to

- August 17th-21st, 2020, International Workshop on Operator Theory and its Applications, Lancaster (UK).  
**Invited talk** at special session on "Quantum groups and algebraic quantum field theory" Postponed for COVID pandemic to 2021

## »»» Some events I took part:

### Past events:

1. December 17-19, 2012, workshop: "NGAP - Noncommutative geometry and application to physics" Milan, Italy.
2. January 29-February 2, 2013, workshop: "Trails in quantum mechanics and surroundings" Frascati, Italy.
3. June 17-28, 2013, summer school: "Rigidité et actions de groupes" at Institut Mathématiques de Jussieu, at Paris Diderot University, Paris, France.
4. July 8-12, 2013 workshop: "Mathematics and Quantum Physics" Accademia dei Lincei, Rome, Italy.
5. September 1-8, 2013, workshop: "Noncommutative Geometry and Applications" organized by Stoilow Institute of Mathematics of the Romanian Academy, Poiana Brasov, Romania.
6. November 14-16, 2013, workshop: 33rd Workshop "Foundations and Constructive Aspects of QFT", Göttingen, Germany,
7. June 16-21, 2014, workshop: "Noncommutative Geometry and Applications"; Villa Mondragone, Frascati, Italy.
8. February 11-13, 2015, workshop: "New trends in algebraic quantum field theory", LNF-INFN, Frascati, Italy
9. April 20-24, 2015, conference: "Advances in Noncommutative Geometry", Paris, France;  
**Invited talk:** "The Bisognano-Wichmann Theorem and Particle Localization"
10. May 29-30, 2015, workshop: "36th, Local Quantum Physics", Leipzig, Germany.  
**Title of the talk:** "On Localization of Infinite Spin Particles"

11. May 17-25, 2016, "NCGOA Spring Institute 2016", Bonn, Germany.
12. June 23, 2016, "Ph.D. Colloquium", Uni. Tor Vergata, Rome, Italy.  
**Invited talk:** "Particle Localization and Infinite Spin"
13. December 20, 2016, "Department's day", Uni. Tor Vergata, Rome, Italy.  
**Invited talk:** "Conformal covariance and the split property".
14. June 6-September 30, 2016, "Intensive trimester Mathematics and Physics at the Crossroads" LNF, Frascati and INdAM, Rome, Italy.
15. February 26- March 3, 2017, workshop: "Noncommutative Geometry and Applications", ICTP - Trieste, Italy.  
**Invited talk:** "Conformal covariance and the split property".
16. June 23-24, 2017, LQP 40 Foundations and Constructive Aspects of Quantum Field Theory, Max-Planck institute for Mathematics in the Sciences, Leipzig (Germany).
17. September 19-22, 2017, "Advances in Mathematics and Theoretical Physics" accademia dei Lincei, Rome.
18. December 8-10, 2017, workshop "Quantum Physics meets Mathematics", Hamburg, Germany.
19. February 2-3, 2018, workshop: "41st, Local Quantum Physics", Leipzig, Germany.  
**Title of the talk:** "A sufficient condition for the Bisognano-Wichmann property"
20. February 15-16, 2018, workshop "Quantum Information and Operator Algebras", INdAM, Rome (Italy)
21. June 4-8, 2018, conference "Algebraic Quantum Field Theory: where Operator Algebra meets Microlocal Analysis", INdAM meeting, Cortona (Italy).  
**Title of the Talk:** "A sufficient condition for the Bisognano-Wichmann property".
22. February 20-22, 2019, 43rd LQP workshop "Foundations and Constructive aspects of QFT" Galileo Galilei Institute Firenze (Italy). **I am part of the organizing committee.**
23. April 16-18, 2019, "Algebraic and geometric aspects in Quantum Field Theory", Universität Freiburg, (Germany).  
**Invited talk:** Bisognano-Wichmann property for asymptotically complete massless theories.
24. December 4-7, 2019, "Operator Algebras in Quantum Field Theory and Quantum Probability", Department of Mathematics, University of Rome Tor Vergata  
**Invited talk:** Bisognano-Wichmann property for asymptotically complete massless theories.
25. June 17-19, 2020, "First Virtual LQP Workshop - 45th LQP", Cardiff Univ. School of Mathematics  
**Title of the talk:** Covariant homogeneous nets of standard subspaces

## Scientific visits

1. May 30-June 6, 2015 visiting Prof. K.-H. Rehren at Institut für Theoretische Physik, Göttingen, Germany.
2. January 23-28, 2017, Visiting Prof. Mihály Weiner at Department of Mathematical Analysis, Budapest University of Technology and Economics (BME)
3. August 21-25, 2017, visiting Dr. Wojciech Dybalski, Technische Universität München, München (Germany)  
**Invited Seminar talk:** "An algebraic condition for the Bisognano-Wichmann property"
4. December 3-8, 2017 visiting Prof. K.-H. Rehren at Institut für Theoretische Physik, Göttingen, Germany.  
**Invited Seminar talk:** "An algebraic condition for the Bisognano-Wichmann property".
5. March 11-16, 2018, visiting Dr. Wojciech Dybalski, Technische Universität München, München (Germany)  
**Invited Seminar talk:** "Comments on the Split property for conformal theories in 3+1 dimensional spacetime"
6. November 5-10, 2018, visiting Dr. Wojciech Dybalski, Technische Universität München, München (Germany)  
**Invited Seminar talk:** "Scale and Möbius covariance in two-dimensional Haag-Kastler net"
7. January 27 - February 2, 2019, visiting Prof. Gandalf Lechner, Univ. Cardiff, School of Mathematics (United Kingdom)  
**Invited Seminar talk:** "Scale and Möbius covariance in two-dimensional Haag-Kastler net"
8. April 8-12, 2019, Visiting Prof. Claudio Dappiaggi, Univ. Pavia. (Italy).  
**Invited Seminar talk:** Split property for free massless finite helicity fields.



9. May 5-10, 2019, visiting Dr. Daniela Cadamuro, Institute of Theoretical Physics, Leipzig (Germany).  
**Invited Seminar talk:** Split property for free massless finite helicity fields.
10. July 21-26, 2019, visiting K.-H. Neeb, Department Mathematik, FAU Erlangen-Nürnberg, (Germany).  
**Invited Seminar talk:** On the Bisognano-Wichmann property for one-particle nets.
11. February 23- March 6, 2020, visiting K.-H. Neeb, Department Mathematik, FAU Erlangen-Nürnberg, (Germany).  
**Invited Seminar Talk:** Spacelike deformations: Higher-spin fields from scalar fields

### » Teaching:

- Teaching assistance at University of Rome "Tor Vergata":
  - **a.y. 2019/2020** Course: "Matematica Generale" at Economy and Finance department, Tor Vergata University (Prof. Stefano Viaggiu).
  - **a.y. 2018/2019** Course: "Matematica Generale" at Economy and Finance department, Tor Vergata University (Prof. Stefano Viaggiu).
  - **a.y. 2017/2018** Course: "Matematica Generale" at Economy and Finance department, Tor Vergata University (Prof. Stefano Viaggiu).
  - **a.y. 2016/2017** Course: "Matematica Generale" at Economy and Finance department, Tor Vergata University (Prof. Stefano Viaggiu).
  - **a.y. 2015/2016** Course: "Matematica Generale" at Economy department, Tor Vergata University (Prof. Stefano Viaggiu).
  - **a.y. 2012/2013** Teaching assistance for the Bachelor/Master degree courses in Mathematics (Prof. Livio Triolo).
- Teaching assistance at University of Rome "Roma Tre":
  - **from a.y. 2010/11 to a.y. 2011/12** Course of Mathematical Analysis: "AM210 - Analisi Matematica 3" at Mathematics Department (Prof. Giovanni Mancini).
  - **a.y. 2011/12** Course of Mathematical Analysis: "AM120 - Analisi Matematica 2" at Mathematics Department (Prof. Luigi Chierchia).
  - **a.y. 2009/10** Course of Mathematical Analysis: "AM2 - Analisi Matematica 2" at Mathematics Department (Prof. Giovanni Mancini).
  - **a.y. 2009/10** Course of Mathematical Analysis: "AM3 - Analisi Matematica 3" at Mathematics Department (Prof. Pierpaolo Esposito).

### » For Recommendation Information

- **Prof. Roberto Longo**, Univ. of Rome Tor Vergata, longo@mat.uniroma2.it
- **Prof. Karl-Henning Rehren**, Univ. of Göttingen, rehren@theorie.physik.uni-goettingen.de
- **Prof. Karl-Hermann Neeb**, Univ. Erlangen-Nürnberg, neeb@mi.uni-erlangen.de

### » Additional information:

- Member of INdAM-GNAMPA from 2012
- **Science communication:** 2016-2017, attending the "Scuola Sperimentale di Comunicazione della Scienza" ("Sperimental school of Science Communication"), Rome, Italy: school with lectures given by experts in communicating science for INFN, ASI, CNR, Radio Tre, and chief editors of Zanichelli  
<http://maddmaths.simai.eu/news-2/scuola-sperimentale-di-comunicazione-della-scienza-201617/>  
I collaborate with the blog on Mathematics and its applications: *Math is in the air - Blog divulgativo sulla matematica applicata*: <http://www.mathisintheair.org/wp/author/vincenzo/>  
The article on false positive had more than 1500 reads.
- Programming Languages/Mathematics Software: C, Mathematica.
- Languages: Italian (native language), English (second language), French (Intermediate), German (beginner)

Vincenzo Morinelli ·

- September, 2007, Grant by Roma Tre University for first year students of Bachelor's courses of Mathematics.
- May, 2011, 14<sup>th</sup> placement to the mathematical national contest organized by INdAM

**Le dichiarazioni rese nel presente curriculum sono da ritenersi rilasciate ai sensi degli artt. 46 e 47 del D.P.R. 445/2000.**

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Rome, 13/07/2020

Vincenzo Morinelli

# Curriculum Vitæ

Priv.Do. Paolo Piovano, Ph.D.

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## RESEARCH INTERESTS

My research area includes **Mathematical Modeling**, the **Calculus of Variations**, **Geometric Measure Theory**, and **PDEs**, and my current research program involves the investigation of models in the framework of **Continuum** and **Molecular Mechanics** that find applications in **Materials Science**, **Nanostructure design**, and **Medical Sciences**. The focus is on free boundary problems and atomistic models related to epitaxially strained and ferromagnetic **thin films**, material **cavities** and **fractures**, **tissue growth**, **bone tissue engineering** in polymeric scaffolds, and the stability of **molecular structures**. The ultimate aim is to **validate reliable models** that are in accordance with the experimental evidence and hence, my investigations benefit from the active cooperation with **applied scientists**.

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## EMPLOYMENT INFORMATION

Dec 2019 - Now	<b>Privatdozent</b> at the University of Vienna, Austria
Sep 2017 - Now	<b>Project Leader and Senior Post-doc</b> , Faculty of Mathematics, University of Vienna, Austria, and <b>head of the research group</b> on Variational Methods and Applications (website: <a href="https://www.univie.ac.at/variationalmethods/">https://www.univie.ac.at/variationalmethods/</a> )
Sep 2013 - Aug 2017	<b>Universitätsassistent</b> , Faculty of Mathematics, University of Vienna, Austria
Mentor	Prof. Ulisse Stefanelli
Jun 2016 - Dec 2016	<b>Adjunct Professor</b> , Webster University Vienna, Austria
Sep 2012 - Aug 2013	<b>Postdoctoral Associate</b> , National Research Council (CNR-IMATI), Pavia, Italy
Mentor	Prof. Ulisse Stefanelli

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## HABILITATIONS

Jun 2020 - Jun 2029	<b>Italian Habilitation</b> , namely “Abilitazione Scientifica Nazionale (ASN) a Professore di II fascia per il settore concorsuale 01/A3 (analisi matematica, probabilità e statistica matematica)”.
Dec 2019	<b>Habilitation in Mathematics</b> (Venia Docendi) successfully completed at the University of Vienna, Austria.

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## EDUCATION

Sep 2009 - Aug 2012	<b>Ph.D. Studies</b> , Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA, USA. Ph.D. certificate on August 14, 2012.
Supervisors	Prof. Irene Fonseca and Prof. Giovanni Leoni
Dissertation	<i>Evolution and Regularity Results for Epitaxially Strained Thin Films and Material Voids</i>

Aug 2007 - Sep 2009	<b>M.Sc. in Mathematics</b> , Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA, USA. Supervisors Prof. Irene Fonseca and Prof. Giovanni Leoni
Feb 2007 - Jul 2007	<b>Research Assistant</b> (MIUR Grant PRIN 05), Department of Mathematics, University of Torino, Italy Mentor Prof. Paolo Cermelli
Sep 2004 - Jul 2006	<b>M.Sc. in Mathematics</b> , Department of Mathematics, University of Turin, Italy, grade: <i>Summa cum Laude et Mentione</i> . Supervisor Prof. Paolo Caldirolì Dissertation <i>Travelling Waves for Suspension Bridge Type Equations</i>
Sep 2001 - Sep 2004	<b>B.Sc. in Mathematics</b> , Department of Mathematics, University of Turin, Italy, grade: <i>Summa cum Laude</i> . Supervisor Prof. Paolo Cermelli Dissertation <i>Power Laws and Phase Transitions: an Application to Human Language</i>

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## PUBLICATIONS

### ■ Submitted to Peer-Reviewed Journals:

- [18] Sh. Kholmatov, P. Piovano  
Existence of minimizers for the SDRI model.  
*Submitted* (2020).  
<https://arxiv.org/abs/2006.06096>
- [17] E. Davoli, M. Kružík, P. Piovano, U. Stefanelli,  
Magnetoelastic thin films at large strains.  
*Submitted* (2020).  
<http://arxiv.org/abs/2003.05178>
- [16] L. Kreutz, P. Piovano,  
Microscopic validation of a variational model of epitaxially strained crystalline films.  
*Submitted* (2019).  
<https://arxiv.org/abs/1902.06561>

### ■ Peer-Reviewed Journal Publications:

- [15] Sh. Kholmatov, P. Piovano,  
A unified model for stress-driven rearrangement instabilities.  
*Arch. Ration. Mech. Anal.*, in press (2020).  
<http://arxiv.org/abs/1902.06535>  
<https://doi.org/10.1007/s00205-020-01546-y>
- [14] E. Davoli, P. Piovano,  
Derivation of a heteroepitaxial thin-film model.  
*Interface Free Bound.*, **22-1** (2020), 1–26.  
<https://doi.org/10.4171/IFB/435>
- [13] M. Friedrich, E. Mainini, and P. Piovano,  
Atomistic potentials and the Cauchy-Born rule for carbon nanotubes: a review  
*Rendiconti Semin. Mat. Univ. Pol. Torino*, **77-2** (2020), 79–98.  
<https://arxiv.org/abs/1909.12023>

- [12] E. Davoli, P. Piovano,  
Analytical validation of the Young-Dupré law for epitaxially-strained thin films.  
*Math. Models Methods Appl. Sci.*, **29-12** (2019), 2183–2223.  
<https://doi.org/10.1142/S0218202519500441>
- [11] E. Mainini, P. Piovano, B. Schmidt, U. Stefanelli,  
 $N^{3/4}$  law in the cubic lattice.  
*J. Stat. Phys.*, **176-6** (2019), 1480–1499.  
<https://doi.org/10.1007/s10955-019-02350-z>
- [10] M. Friedrich, E. Mainini, P. Piovano, U. Stefanelli,  
Characterization of optimal carbon nanotubes under stretching and validation of the Cauchy-Born rule.  
*Arch. Ration. Mech. Anal.*, **231-1** (2019), 465–517.  
<https://doi.org/10.1007/s00205-018-1284-7>
- [9] E. Mainini, H. Murakawa, P. Piovano, U. Stefanelli,  
Carbon-Nanotube Geometries as Optimal Configurations.  
*Multiscale Model. Simul.*, **15-4** (2017), 1448–1471.  
<https://doi.org/10.1137/16M1087862>
- [8] E. Davoli, P. Piovano, and U. Stefanelli,  
Sharp  $N^{3/4}$  Law for the Minimizers of the Edge-Isoperimetric Problem on the Triangular Lattice  
*J. Nonlinear Sci.*, **27-2** (2017), 627–660.  
<https://doi.org/10.1007/s00332-016-9346-1>
- [7] E. Mainini, H. Murakawa, P. Piovano, U. Stefanelli,  
Carbon-Nanotube Geometries: Analytical and Numerical Results.  
*Discret. Contin. Dyn. Syst. Ser. B*, **10-1** (2017), 141–160.  
<https://doi.org/10.3934/dcdss.2017008>
- [6] M. Friedrich, P. Piovano, U. Stefanelli,  
The Geometry of  $C_{60}$ : A rigorous Approach via Molecular Mechanics.  
*SIAM J. Appl. Math.*, **76-5** (2016), 2009–2029.  
<https://doi.org/10.1137/16M106978X>
- [5] E. Davoli, P. Piovano, U. Stefanelli,  
Wulff Shape Emergence in Graphene.  
*Math. Models Methods Appl. Sci.*, **26-12** (2016), 2277–2310.  
<https://doi.org/10.1142/S0218202516500536>
- [4] E. Mainini, P. Piovano, U. Stefanelli,  
Crystalline and Isoperimetric Square Configurations.  
*Proc. Appl. Math. Mech.* **14**, (2014) 1045–1048.
- [3] E. Mainini, P. Piovano, U. Stefanelli,  
Finite Crystallization in the Square Lattice.  
*Nonlinearity*, **27** (2014), 4:717–737.  
<https://doi.org/10.1088/0951-7715/27/4/717>
- [2] P. Piovano,  
Evolution of Elastic Thin Films with Curvature Regularization via Minimizing Movements.  
*Calc. Var. Partial Differential Equations*, **49** (2014), 337–367.  
<https://doi.org/10.1007/s00526-012-0585-1>



- **Monographs:**

- [1] P. Piovano,  
Evolution and Regularity Results for Epitaxially Strained Thin Films and Material Voids.  
*ProQuest PhD Thesis – Carnegie Mellon University* 2012, Vol. **74-01(E)**, Sect. B, p. 108. ISBN: 978126765534

- **Non Peer-Reviewed Publications:**

L. Kreutz, P. Piovano,  
Microscopic validation of a variational model of epitaxially strained crystalline films.  
*Oberwolfach Rep.* **49** (2019), 35–37.  
[https://www.mfo.de/occasion/1844/www\\_viewpdf](https://www.mfo.de/occasion/1844/www_viewpdf)

## GRANTS AS PRINCIPAL INVESTIGATOR (PI)

Jan 2021 - Dec 2022 *PI* for the grant awarded by the Austrian Science Fund (FWF):

<b>Source</b>	<a href="#">1000 Ideas Programme</a>
<b>Title</b>	MAThematical Modeling of BOne engineering (MAMBOing)
<b>Budget</b>	~143K €
<b>Period</b>	2 years

Jan 2020 - Dec 2021 *PI* for the Austrian side for the grant funded by OeAD/International Cooperation in Higher Education with *I. Velčić* (U. Zagreb, Croatia) co-PI for the Croatian side:

<b>Source</b>	<a href="#">WTZ Grant Scientific &amp; Technological Cooperation Austria/Croatia</a>
<b>Title</b>	Variational Multiscale Models for Materials (VarM <sup>3</sup> )
<b>Budget</b>	~8K €
<b>Period</b>	2 years

Jul 2017 - Aug 2021 *PI* for a grant awarded by the Vienna Science and Technology Fund (WWTF) with Co-PI *U. Diebold* (TU Vienna) and financial support also from [Berndorf Privatstiftung](#):

<b>Source</b>	<a href="#">WWTF “Mathematics and...” Program</a>
<b>Title</b>	MODELing and DESign of epitaxially strained NAnoIslands (MODENA)
<b>Budget</b>	~600K €
<b>Period</b>	4 years
<b>Website</b>	<a href="https://modena.univie.ac.at">https://modena.univie.ac.at</a>

Sep 2017 - Aug 2021 *PI* for the grant awarded by the Austrian Science Fund (FWF):

<b>Source</b>	<a href="#">FWF Stand-Alone Project</a>
<b>Title</b>	Optimal Shapes of Crystal Interfaces (OSCI)
<b>Budget</b>	~332K €
<b>Period</b>	4 years
<b>Website</b>	<a href="https://osci.univie.ac.at">https://osci.univie.ac.at</a>

11-15 Nov 2019 *Organizer* together with *U. Diebold* (TU Vienna) and *I. Fonseca* (CMU, USA) of the workshop supported by the [Erwin Schrödinger International institute \(ESI\)](#):

<b>Source</b>	ESI Workshop
<b>Title</b>	Modeling of Crystalline Interfaces and Thin Film Structures: a Joint Mathematics-Physics Symposium
<b>Budget</b>	14.4K €
<b>Period</b>	1 week
<b>Website</b>	<a href="https://www.univie.ac.at/esi_workshop_thin_films/">https://www.univie.ac.at/esi_workshop_thin_films/</a>

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## PROJECT TEAM MEMBER

Jan 2019 - Dec 2020 *Co-author and co-applicant* for the research project funded by [Austrian Science Fund \(FWF\)](#) with PI *Sh. Kholmatov* (Vienna):

<b>Source</b>	<a href="#">FWF Lise-Meitner Program</a>
<b>Title</b>	Liquid and Crystalline Films: Wetting and Evolution
<b>Budget</b>	~156K€
<b>Period</b>	2 years

Jan 2019 - Dec 2020 *Team member* for the research projects with PIs *E. Davoli* (Vienna) and *M. Kružík* (UTIA, Prague): WTZ Scientific and Technological Cooperation Project of the OeAD (title: Mathematical Frontiers in Large Strain Continuum Mechanics, period: 2019-2020, budget: 7K€), FWF-GACR Joint International Project (title: Large Strain Challenges in Materials Science, country: Czech Republic, period: 2019-2021, budget: ~366K€).

Sep 2015 - Aug 2017 *Team member* for the research projects with PI *U. Stefanelli* (Vienna): WTZ Scientific and Technological Cooperation Project of the OeAD (title: Thermomechanics of solids: modeling, analysis, and simulations, period: 2016-2018, budget: 7K€), FWF-GACR Joint International Project (title: Variational Structures in Thermomechanics of Solids, period: 2016-2019, budget: ~109K€), WWTF “Mathematics and ..” Grant (title: Variational Modeling of Carbon Nanostructures, period: 2015–2018, budget: ~540K€), FWF Grant (title: Global Variational Methods for Nonlinear Evolution, period: 2015-2017, budget: ~330K€).

Sep 2009- Aug 2012 *Research Fellowships* for the research projects with PI *G. Leoni* (CMU, Pittsburgh): American National Science Foundation (NSF) Grant No. DMS-0708039 (title: Modern methods in the Calculus of Variations with applications to materials science and hydrodynamics, budget: ~132K\$), Grant No. DMS-1007989 (title: Variational methods for materials science, mechanics, and imaging, period: 2010-2014, budget: ~300K\$).

Sep 2007- Aug 2009 *Research Fellowships* for the research projects with PI *I. Fonseca* (CMU, Pittsburgh): American National Science Foundation (NSF) Grant No. DMS-0401763 (title: Variational Problems and their Applications, budget: ~500K\$) and Grant No. DMS-0905778 (title: Variational Methods in Imaging and in Materials, budget: ~1170K\$).

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## PERSONAL RESEARCH GROUP

Name: *Variational Methods and Applications*, Faculty of Mathematics, University of Vienna.

Website: <https://www.univie.ac.at/variationalmethods/>

Postdoc Members: - Dr. Leonard Kreutz for a year from September 18, 2017;  
- Dr. Shokhrukh Kholmatov from October 1, 2017;

PhD Student: - Randy Llerena from September 16, 2019 (in co-supervision with Prof. Jean-François Babadjian, University Paris Sud).

Predocs: Mr. Filipp Lausch, Bachelor thesis at the Department of Mathematics, University of Vienna with thesis dissertation on January 20, 2016.

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## COOPERATION RESEARCH PARTNERS

I. Fonseca, G. Leoni (Carnegie Mellon University, Pittsburgh, USA); H. Murakawa (Kyushu University, Fukuoka, Japan); B. Schmidt (Augsburg, Germany); M. Friedrich, L. Kreutz (Münster, Germany); P. Caldiroli, P. Cermelli (Turin, Italy); E. Mainini (Genoa, Italy); Stefan Krömer, Martin Kružík (Prague, Czech Republic); Igor Velčić (Zagreb, Croatia); Sh. Kholmatov, U. Stefanelli (Vienna, Austria); E. Davoli, U. Diebold (TU Vienna); F. Jenner (University of Veterinary Medicine, Vienna).

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## SCIENTIFIC VISITS

- Sep 2015 - May 2019 *Visiting Scholar* at the Institute of Information Theory and Automation, Academy of Sciences, Prague, Czech Republic under the invitation of Prof. Martin Kružík in the periods: September 16 - 20, 2015; March 20 - 25, 2016; June 27 - 30, 2017; November 11-15, 2018; May 14-17, 2019.
- May 30 - Jul 15, 2016 *Invitation to the Thematic Program* on “Nonlinear Flows” held at the ESI, Vienna.
- Jan 2013 - Feb 2015 *Visiting Scholar* at the Center for Nonlinear Analysis, Carnegie Mellon University, Pittsburgh, PA, USA under the invitation of Prof. Irene Fonseca in the periods: Jan 31 - Feb 8, 2015; Mar 15 - 23, 2014; May 24 - June 7 2013; Jan 6 - 13, 2013.
- Sep 29 - Nov 21, 2014 *Invitation to the Thematic Program* on “Minimal Energy Point Sets, Lattices and Designs” held at the ESI, Vienna.
- Jul 12 - 20, 2014 *Participation in the IAS/PCMI Research Program* at the 24<sup>th</sup> Annual Summer Session on “Mathematics and Materials” held at IAS/PCMI, Salt Lake City, UT, USA.
- Mar 3-8, Apr 3-13, '13 *Intensive Period* on “Evolution Problems in Fracture Mechanics” at SISSA, Trieste, Italy.
- Oct 2011 - Mar 2012 *Visiting Scholar* at the Department of Mathematics and Application, University of Naples, Italy, under the mentorship of Prof. Nicola Fusco.

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## PRESENTATIONS

- Jun 15-19, 2020 (postponed) *Invited Presentation* at a minisymposium at SIMAI Conference, Parma, Italy.
- May 18 - 22, 2020 (postponed) *Invited Presentations* at the Minisymposia MS14 and MS33 of the SIAM Conference MS20 organized in Bilbao, Spain.
- Mar 27, 2020 (postponed) *Invited Lecture* at the “Seminario di Calcolo delle Variazioni & Equazioni alle Derivate Parziali”, University of Florence, Italy.
- Nov 19, 2019 *Invited Presentation* at the Workshop “Recent Advances in Mechanics and Mathematics of Materials” (RAM3), Rome, Italy.
- Feb 22, 2019 *Invited Talk* at GAMM Annual Meeting (S14 - Applied analysis), Vienna, Austria.
- Nov 12, 2018 *Invited Lecture* at the “Nečas Seminar on Continuum Mechanics” held at the Mathematical Institute of Charles University, Prague, Czech Republic.
- Nov 1, 2018 *Invited Seminar* at the Oberwolfach Workshop on “Emergence of Structures in Particle Systems: Mechanics, Analysis and Computation” held at MFO, Oberwolfach, Germany.
- Sep 20, 2018 *Invited Seminar* at the joint PTM-SIMAI-UMI Mathematical Meeting that will be held in Wrocław, Poland.
- July 5-9, 2018 *Two Invited Seminars* in the sessions SS75 “Mathematics and materials: models and applications” and SS144 “Analytic properties and numerical approximation of differential models arising in applications”, respectively, at the 12<sup>th</sup> AIMS Conference on “Dynamical Systems, Differential Equations and Applications” held in Taipei, Taiwan.
- June 29, 2018 *Invited Seminar* in the framework of the Applied Analysis Day at TU Dresden, Germany.
- May 21, 2018 *Invited Seminar* at the BIRS Workshop on “Topics in the Calculus of Variations: Recent Advances and New Trends” held at The Banff Centre in Banff, Alberta, Canada.
- Feb 16, 2018 *Invited Seminar* at the “XXVIII<sup>th</sup> Convegno Nazionale di Calcolo delle Variazioni” held in Levico Terme, Italy.
- Jan 18, 2018 *Invited Seminar* at the DK Winter Workshop & SFB Internal Meeting held in Reichenau an der Rax, Austria.
- May 25, 2017 *Invited Talk* at the International Conference on “Elliptic and Parabolic Problems” held Gaeta, Italy.
- April 4, 2017 *Invited Seminar* at the Workshop “Modern challenges in continuum mechanics” held at the University of Zagreb, Croatia.
- Nov 10, 2016 *Invited Lecture* at the Augsburg-Munich Seminar, Institut für Mathematik, Universität Augsburg, Germany.

- Sep 12, 2016 *Invited Lecture* at the University of Zagreb, Croatia.
- Jun 15, 2016 *Invited Talk* at the Workshop on “Entropy methods, dissipative systems, and applications”, held at the Erwin Schrödinger International Institute for Mathematical Physics (ESI), Vienna, Austria.
- Mar 21, 2016 *Invited Lecture* at the “Nečas Seminar on Continuum Mechanics” held at the Mathematical Institute of Charles University, Prague, Czech Republic.
- Feb 24, 2016 *Invited Seminar* at the ERC Workshop on “Modeling Materials and Fluids Using Variational Methods” held at Weierstraß-Institut für Angewandte Analysis und Stochastik (WIAS), Berlin, Germany.
- Jul 2, 2015 *Invited Talk* at the Workshop on “Trends in Non-Linear Analysis” held at SISSA, Trieste, Italy (July 1 - 3).
- Apr 30, 2015 *Invited Lecture* at the Analysis and Geometry Seminar of the American University of Beirut, Lebanon.
- Mar 27, 2015 *Invited Talk* at the GAMM Annual Meeting (S14 - Applied analysis), Lecce, Italy (March 23 - 27).
- Oct 16, 2014 *Invited Talk* at the Workshop on “Optimal Point Configurations and Applications” held at the Erwin Schrödinger International Institute for Mathematical Physics (ESI), Vienna, Austria (October 13 - 17).
- Sep 8, 2014 *Invited Talk* at the XIX<sup>th</sup> Symposium on Trends in Applications of Mathematics to Mechanics (STAMM), held in Poitiers, France (September 8 - 11).
- Apr 23, 2014 *Invited Talk* at the SFB ViCoM: Young Researchers Meeting held in Vienna, Austria (April 22 - 23).
- Mar 11, 2014 *Invited Talk* at GAMM Annual Meeting Minisymposium hosted by FAU Erlangen-Nürnberg, Germany (March 10 - 14).
- Jun 9, 2013 *Poster Presentation* at the SIAM Conference on “Mathematical Aspects of Materials Science (MS13)” held in Philadelphia, PA, USA (June 9 - 12).
- May 30 - Jun 7, 2013 *Poster Presentation* at the CNA Summer School held at Carnegie Mellon University, Pittsburgh, PA, USA.
- Feb 7, 2013 *Invited Talk* at the conference “XXIII<sup>rd</sup> Convegno Nazionale di Calcolo delle Variazioni”, held in Levico Terme, Italy (February 4 - 8).
- Sep 25, 2012 *Institute Seminar* at IMATI-CNR, Pavia, Italy.
- Sep 10 - 12, 2012 *Poster Presentation* at the workshop “Variational Models and Methods for Evolution” held in Levico Terme, Italy.
- Feb 21, 2012 *Department Seminar* at the Institute for Computational and Applied Mathematics, University of Münster, Germany.
- Jan 6, 2012 *Accepted Talk* at the AMS Special Session of the Joint Mathematics Meetings held in Boston (January 4 - 7).
- Nov 14, 2011 *Contributed Talk* at SIAM Conference on “Analysis of Partial Differential Equations (PD11)” held in San Diego, California (November 14 - 17).

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## ORGANIZATION OF EVENTS

- Sep 7 - 9, 2020 (on hold) *Workshop organizer* together with G. Bellettini (U. Siena) and Sh. Kholmatov hosted at the University of Vienna, Austria, (title: *Free Boundary Problems and related Evolution Equations*, website: <http://cvgmt.sns.it/event/591/>).
- May 18 - 22, 2020 (postponed) *Minisymposium Organizer* together with E. Davoli (U. Vienna) at the *SIAM Conference MS20* in Bilbao, Spain (title: *Multiscale methods in materials science*, code: MS37, website: <https://wp.bcamath.org/siamms20/>).

- Nov 11 - 15, 2019 *Workshop organizer* together with *U. Diebold* (TU Vienna) and *I. Fonseca* (CMU, Pittsburgh) of the workshop hosted at the Erwin Schrödinger International institute (ESI), Vienna (title: *Modeling of Crystalline Interfaces and Thin Film Structures: a Joint Mathematics-Physics Symposium*, website: [https://www.univie.ac.at/esi\\_workshop\\_thin\\_films/](https://www.univie.ac.at/esi_workshop_thin_films/)).
- Oct 2, 2013 *Invitation to the Roundtable Session* on “The International Researcher” at the ERC-PIRE Workshop on “Evolution Problems for Material Defects: Dislocations, Plasticity, and Fracture” held at SISSA, Trieste, Italy (September 30 - October 4).
- Jun 24 - 26, 2013 *Local organizer of a ERC Workshop* held at the University of Pavia, Italy (title: *Variational Views in Mechanics and Materials*).

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## MEMBERSHIPS AND AFFILIATIONS

- Jun 2017 Member of the *commission for the habilitation* at the University of Vienna of Dr. Dietmar Ölz, School of Mathematics and Physics, University of Queensland, Australia
- Feb 2016 - Now Affiliated to INDAM/GNAMPA at the research unit of National Research Council (CNR-IMATI), Pavia, Italy
- Jan 2014 - Now Member of the International Society for the Interaction of Mechanics and Mathematics (ISIMM)

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## JOURNAL REVIEW ACTIVITIES

- For *Archive for Rational Mechanics and Analysis*, Springer Berlin Heidelberg (<https://link.springer.com/journal/205>).
- For *Communications in Mathematical Physics*, Springer Germany (<https://www.springer.com/journal/220>).
- For *SIAM Journal on Mathematical Analysis (SIMA)*, Society for Industrial and Applied Mathematics (<https://www.siam.org/journals/sima.php>).
- For *Meccanica*, Springer, (<https://link.springer.com/journal/11012>).
- For *Discrete and Continuous Dynamical Systems - S (DCDS-S)*, American Institute of Mathematical Sciences (<https://aimsciences.org/journals/home.jsp?journalID=15>).

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## STUDENT AWARDS

- Nov 2011 *AMS Grad Student Travel Grant* for the Joint Mathematics Meetings, Boston, MA, January 4 - 7, 2012.
- Jul 2011 *SIAM Student Travel Award* to attend the SIAM Conference on “Analysis of Partial Differential Equations (PD11)” held in San Diego, CA, November 14 - 17, 2011.
- Aug 2010 - May 2011 *Teaching assistantship* granted to support Ph.D. studies funded by the Department of Mathematical Sciences, Carnegie Mellon University.
- Feb 2007 - Jul 2007 *Research fellowship* in the framework of a MIUR founded research project (PRIN 05), Department of Mathematics, University of Torino, Italy.

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## TEACHING TRAINING

- Sep 2017 - Sep 2018 Nominated by the Faculty of Mathematics, University of Vienna to attend the *Teaching Competence Plus* certificate course (<https://ctl.univie.ac.at/veranstaltungen/zertifikatskurs/>) of the Center for Teaching and Learning (CTL), University of Vienna. Certificate awarded on November 21, 2018.
- Apr 2012 CNA (Center for Nonlinear Analysis, CMU)-PIRE Workshop on *Course and Syllabus Design* held by Marie Norman, associate director of Eberly Center for Teaching Excellence (<https://www.cmu.edu/teaching/eberly/>).
- Sep 2008 - Sep 2011 *Teaching Training* at the Intercultural Communication Center, Carnegie Mellon University (<https://www.cmu.edu/icc/>).

- Apr 2010 *International Teaching Assistant (ITA) Test* was passed. ITA Test is required by both Pennsylvania Law and Carnegie Mellon policy for nonnative speakers before they can work as teaching assistants.
- Spring 2010 Successful attendance of the course on *Language and Culture for Teaching* held by P. A. Heidish, Director of the Intercultural Communication Center, Carnegie Mellon University.

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## TAUGHT COURSES

- Sept 2017- Now *Lecturer* at the University of Vienna, Department of Mathematics for the following courses:
- Fall 2019 - “Sobolev Spaces and the Calculus of Variations”, graduate level.
- Spring 2018 - “Topics in the Calculus of Variations” (with E. Davoli and U. Stefanelli), graduate level (see <https://www.mat.univie.ac.at/~stefanelli/tcdv.html>).
- Oct 2013 - Aug 2017 *Teaching Assistant* at the University of Vienna, Department of Mathematics for the following courses:
- Fall 2016 - “Partielle Differentialgleichungen”, undergraduate level.
- Spring 2016 - “Analysis”, undergraduate level (see [https://complex.univie.ac.at/fileadmin/user\\_upload/p\\_complex\\_analysis/skriptenlamel/Analysis\\_2016.pdf](https://complex.univie.ac.at/fileadmin/user_upload/p_complex_analysis/skriptenlamel/Analysis_2016.pdf)).
- Fall 2015 - “Höhere Analysis und Differentialgeometrie”, undergraduate level (see <https://www.mat.univie.ac.at/~stefanelli/hoehereanalysis.html>).
- Spring 2015 - “Analysis”, undergraduate level (see <https://www.mat.univie.ac.at/~stefanelli/analysis.html>).
- Fall 2014 - “Einführung in die Analysis”, undergraduate level (see <https://www.mat.univie.ac.at/~stefanelli/einfuehrung.html>);
- Fall 2014 - “Einführung in das mathematische Arbeiten”, undergraduate level (see <https://www.mat.univie.ac.at/~einfuehrung/index.html>);
- Fall 2013 - “Modellierung”, undergraduate level (see <https://homepage.univie.ac.at/christian.schmeiser/MOD-WS1314.htm>);
- Jun 2016 - Dec 2016 *Lecturer* at Webster University Vienna, for the following course:
- Fall 2016 - “College Algebra”, undergraduate level (see <http://webster.ac.at/mathematics>).
- Aug 2010 - May 2011 *Teaching Assistant* at Carnegie Mellon University, Department of Mathematics for the following courses:
- Spring 2011 - “Calculus in Three Dimensions”, undergraduate level (around 100 students);
- Fall 2010 “Differential Equations”, undergraduate level (around 100 students).

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## LANGUAGES

- German B2/2 Level, certificate from Innovationszentrum, University of Vienna on September 6, 2017.
- English Fluent, ITA Test successfully passed at Carnegie Mellon University on April 23, 2010.
- Italian Mother tongue.

# Curriculum Vitae et Studiorum

Emanuela Radici

July 2020

## Current Position

- from 01/09/2019: Instructor of Analysis at École polytechnique fédérale de Lausanne

## Education

- from 01/10/2016 - 31/08/2019: postDoc at Università degli Studi dell'Aquila, mentore prof. M. Di Francesco
- 09/12/2016 at Department of Mathematics of Friedrich–Alexander Universität Erlangen–Nürnberg: PhD defense in Mathematik ”*magna cum laude*” discussing the thesis *Diffeomorphic approximation of planar elastic deformations*; advisor prof. A. Pratelli.
- 7/05/2014 at Istituto Universitario di Studi Superiori (IUSS) in Pavia: Diploma license discussing *Study of a Cahn-Hilliard type phase field model related on tumor growth*; advisor prof. P. Colli, coadvisor prof. F. Brezzi,
- 15/07/2013 at Università degli Studi di Pavia: Master degree in Mathematics ”110/110 *cum laude*” discussing the thesis *Analysis of a 2D model for epitaxially strained growth of islands and properties of minimal configurations*; advisor prof. A. Pratelli
- 01/03/2013-30/06/2013 Erasmus Placement Student at FAU Erlangen Nürnberg; tutor prof. A. Pratelli
- 20/09/2011 at Università degli Studi di Pavia: Bachelor degree in Mathematics ”110/110 *cum laude*” discussing the thesis *Minimizing Movements*; advisor prof. E. Vitali
- 2008-2013: fellow of Collegio Universitario d’eccellenza Santa Caterina da Siena in Pavia
- 2003-2008: student at Scientific High School Niccolò Copernico in Pavia, Piano Nazionale Informatico, final grade 100/100.

## Thesis

- *Minimizing Movements*, Bachelor degree, supervisor prof. E. Vitali.
- *Analysis of a 2D model for epitaxially strained growth of islands and properties of minimal configurations*, Master degree, supervisor prof. A. Pratelli.
- *Study of a Cahn-Hilliard type phase-field model related to tumor growth*, IUSS diploma, advisor prof. P. Colli, coadvisor prof. F. Brezzi.



- *Diffeomorphic approximation of planar elastic deformations* , PhD Thesis, supervisor prof. A. Pratelli.

## Works

- D. Campbell, S. Hencl, A. Kauranen, E. Radici: *Strict limits of BV planar homeomorphisms*, 2018, *Nonlinear Analysis* 177, 209-237.
- D. Campbell, A. Pratelli, E. Radici: *Comparison between the non-crossing and the non-crossing on lines properties*, 2020, preprint
- C. Dappiaggi, F. Finster, S. Murro, E. Radici: *The Fermionic signature operator in De Sitter spacetime*, 2020, *J. Math. Anal. and Appl.* 485-2, 123808
- M. Di Francesco, S. Fagioli, E. Radici: *Deterministic particle approximation for nonlocal transport equations with nonlinear mobility*, 2019, *J. Differential Equations* 266, 2830-2868.
- S. Fagioli, E. Radici: *Solutions to aggregation-diffusion equations with nonlinear mobility constructed via a deterministic particle approximation*, 2018, *Math. Mod. and Meth. in App. Sci.* 28, 1801-1829.
- S. Fagioli, E. Radici: *Opinion formation systems via deterministic particle approximation*, 2020, preprint.
- A. Pratelli, E. Radici: *On the piecewise approximation of bi-Lipschitz curves*, 2017, *Rend. Sem. Mat. Univ. Padova* 138, 1-37.
- A. Pratelli, E. Radici: *On the planar minimal BV extension problem*, 2018, *Rendiconti Lincei: Matematica e Applicazioni* 29-3, 511-555.
- A. Pratelli, E. Radici: *Approximation of BV planar homeomorphisms by diffeomorphisms*, 2019, *Journal of Functional Analysis* 276, 659-686.
- E. Radici: *A planar  $W^{1,p}$  Sobolev extension theorem for piecewise linear homeomorphisms*, 2016, *Pacific Journal of Mathematics* 283-2, 405-418.

## Prizes and Awards

- IUSS study prize in the years 2008/09, 2009/10, 2010/11, 2011/12, 2012/13
- refund from Università degli Studi di Pavia for on time degree, 2013.

## Organization of Workshops

- Organizer of "Mini-Workshop on Optimal Transport and PDEs in Applied Sciences", GSSI L'Aquila, April 6-7 2017.
- Organizer of "136<sup>th</sup> European Study Groups with Industry (ESGI)", GSSI L'Aquila, May 14-18 2018.
- Organizer of "Cross-diffusion systems, gradient flows, and their perturbations", GSSI L'Aquila, April 10-13 2019.

## Visiting for cooperation



- Faculty of Mathematics and Physics at Charles University, May 2016 in Prague.
- Department Mathematik, Universität Regensburg, during 2015/2016 in Regensburg.
- Department Mathematik, Friedrich–Alexander Universität Erlangen–Nürnberg, December 2016 in Erlangen.
- Faculty of Mathematics and Physics at Charles University, May 2017 in Prague.
- Department Mathematik, Friedrich–Alexander Universität Erlangen–Nürnberg, April 2018 in Erlangen.
- Department of Mathematics, Pontificia Universidad Católica de Chile, August 2018 in Santiago de Chile.
- Department of Mathematics, ESI Institute, May 2019 in Vienna.
- Department of Mathematics, University of Pisa, December 2019.
- Department of Mathematics, University of Hradec Kralove, April 2020 (postponed to autumn 2020).

#### Participation to research projects

- 16/09/2013-31/8/2015: PhD position funded by *ERC Starting Grant* 258685 - P.I. Aldo Pratelli,
- participant to *GNAMPA2017* project "Analisi Di Modelli Matematici Della Fisica, Della Biologia E Delle Scienze Sociali", P.I. Stefano Spirito.

#### Invited Talks

- April 2014, Seminar Talk at C.I.A., University of Cambridge.
- May 2016, Seminar Talk, "*Oberseminar Analysis*", Universität Regensburg.
- May 2016, Seminar Talk at Charles University in Prague.
- May 2017, Seminar Talk at Charles University in Prague.
- July 2017, Seminar Talk, *Aggregation-Diffusion PDEs: Variational Principles, Nonlocality and Systems*, Anacapri.
- August 2018, Seminar Talk at Pontificia Universidad Católica de Chile, Santiago.
- September 2018, Seminar Talk, *Interactive workshop on hyperbolic equations*, Ferrara.
- October 2018, Seminar Talk, *Workshop on New Developments in PDEs and Related Topics*, Napoli.
- June 2019, Seminar Talk, *Singular nonlinear problems in Calculus of Variations and PDE's*, Napoli.
- December 2019, Seminar Talk at University of Pisa.
- June 2020, Seminar Talk, *Special Session "Nonlocal balance laws: Theory and Applications" at AIMS Conference on Dynamical Systems and Differential Equations*, Atlanta. (postponed to 2021).

### Contributed talks

- Sept. 2013, Short Talk, "*New trends in shape optimization*", Friedrich–Alexander Universität Erlangen–Nürnberg.
- Jan. 2014, Short Talk, "*XXIV Convegno Nazionale di Calcolo delle Variazioni*", Levico Terme.
- January 2016, Short Talk, "*XXVI Convegno Nazionale di Calcolo delle Variazioni*", Levico Terme.
- February 2016, Short Talk, "*PDEs and applications*", Università di Napoli.
- September 2017, Seminar Talk, "*IperPv 2017*", Università di Pavia.
- June 2018, Short Talk, "*Hyp2018*", Penn State University.
- September 2018, Short Talk, "*Analysis of Differential Operators on Manifolds*", Freiburg Universität.
- February 2019, Short Talk, "*XXIX Convegno Nazionale di Calcolo delle Variazioni*", Levico Terme.
- May 2019, Short Talk, "*Introductory School on Optimal Transport*", ESI Institute Wien.
- June 2019, Seminar Talk, "*Crowds: Model and Control*", CIRM Marseille.
- June 2019, Short Talk, "*People in Optimal Transport and Applications*", Cortona.

### Teaching Experience

- teaching assistant for *Analysis 1* lectures, winter semester 2014/2015 at Department Mathematik der FAU Erlangen-Nürnberg. (Language: german)
- teaching assistant for *Analysis 2* lectures, summer semester 2014/2015 at Department Mathematik der FAU Erlangen-Nürnberg. (Language: german)
- teaching assistant for *Mehrdimensionale Integration* lectures, winter semester 2015/2016 at Department Mathematik der FAU Erlangen-Nürnberg. (Language: german)
- teaching assistant for *Maßtheorie* lectures, summer semester 2015/2016 at Department Mathematik der FAU Erlangen-Nürnberg. (Language: german)
- teaching assistant for *Analisi Matematica II* lectures, summer semester 2016/2017 at Department of Information Engineering, Computer Science and Mathematics of Università dell'Aquila (Language: italian)
- teaching assistant for *Analisi Matematica I* lectures, winter semester 2017/2018 at Department of Information Engineering, Computer Science and Mathematics of Università dell'Aquila (Language: italian)
- teaching assistant for *Mathematics I* lectures, winter semester 2017/2018 at LUISS (Language: english)

- tutoring for *Precourses for Mathematics I* lectures, winter semester 2017/2018 at LUISS (Language: italian)
- tutoring for *Mathematics* lectures, winter and summer semester 2018/2019 at LUISS (Language: italian and english)
- teaching assistant for *Analisi Matematica I* lectures, winter semester 2018/2019 at Department of Civil, Construction-Architectural and Environmental Engineering of Università dell'Aquila (Language: italian)
- teaching assistant for *Analisi Matematica II* lectures, summer semester 2018/2019 at Department of Civil, Construction-Architectural and Environmental Engineering of Università dell'Aquila (Language: italian)
- PhD course *Some Aspects of Calculus of Variations*, winter semester 2019/2020 at the Department of Mathematics of École polytechnique fédérale de Lausanne (Language: english)
- *Analyse II*, summer semester 2019/2020 at the Department of Chemistry and Biology of École polytechnique fédérale de Lausanne (Language: french)
- Master course *Distribution and Interpolation spaces*, winter semester 2020/2021 at the Department of Mathematics of École polytechnique fédérale de Lausanne (Language: english)
- PhD course *Some Aspects of Calculus of Variations*, winter semester 2020/2021 at the Department of Mathematics of École polytechnique fédérale de Lausanne (Language: english)
- *Analyse II*, summer semester 2020/2021 at the Department of Chemistry and Biology of École polytechnique fédérale de Lausanne (Language: french)

## Workshops and Schools

- Workshop "*New trends in shape optimization*", September 2013 at FAU Erlangen–Nürnberg (Erlangen).
- Workshop "*XXIV Convegno Nazionale di Calcolo delle Variazioni*", January 2014 in Levico Terme.
- Winter school *Calculus of Variations in Physics and Material Science*, February 2014 in Würzburg.
- Summer School *Partial Differential Equation and Geometric Measure Theory*, June 2014 in Cetraro.
- ERC Workshop *Existence and Regularity for Nonlinear Systems of Partial Differential Equations*, July 2014 at Centro de Giorgi (Pisa).
- ERC School *Free Discontinuity Problems*, July 2014 at Centro de Giorgi (Pisa).
- Workshop *Optimal Transport in the Applied Sciences*, December 2014 at Johann Radon Institute (RICAM) in Linz.
- Workshop "*XXV Convegno Nazionale di Calcolo delle Variazioni*", February 2015 in Levico Terme.

- Intensive Period *Variational Methods for Plasticity and Dislocations*, March-April 2015 at SISSA.
- Workshop *Geometric Analysis, Free Boundary Problems and Measure Theory*, June 2015 in Lipsia.
- Workshop *Shape optimization and spectral geometry*, July 2015 at ICMS in Edinburgh.
- Workshop *Workshop Analysis in Lyon*, October 2015 in Lyon.
- Winter School *Nonlinear Function Spaces in Mathematics and Physical Sciences*, December 2015 in Lyon.
- Workshop *XXVI Convegno Nazionale di Calcolo delle Variazioni*, January 2016 in Levico Terme.
- Workshop and Winter School *PDEs and Applications*, February 2016 in Napoli.
- Winter School *Calculus of Variations in Physics and Materials Science*, February 2016 in Würzburg.
- Workshop *Analysis, Geometry, and Optimal Transport*, June 2016 in Seoul.
- Workshop *A Mathematical Tribute to Ennio De Giorgi*, September 2016 at Centro de Giorgi (Pisa).
- Workshop *Conference in Calculus of Variations and Partial Differential Equation*, October 2016 in Lecce.
- Workshop *Workshop in Geometric Measure Theory, Shape Optimisation and Free Boundaries*, October 2016 at SISSA.
- Workshop *XXVII Convegno Nazionale di Calcolo delle Variazioni*, February 2017 in Levico Terme.
- Workshop *Workshop on PDEs: Modelling, Analysis and Numerical Simulation*, June 2017 in Granada.
- Workshop *Aggregation-Diffusion PDEs Variational Principles, Non-locality and Systems*, July 2017 in Anacapri.
- Workshop *IperPv 2017, XVII Italian Meeting on Hyperbolic Equations*, September 2017 in Pavia.
- Workshop *XXVIII Convegno Nazionale di Calcolo delle Variazioni*, February 2018 in Levico Terme.
- Workshop *Methods and Models of Kinetic Theory*, June 2018 in Porto Ercole.
- Workshop *Hyp2018*, June 2018 in Penn State.
- Workshop *Meeting on Applied Mathematics and Calculus of Variations*, September 2018 in Roma.
- Workshop *Interactive workshop on hyperbolic equations*, September 2018 in Ferrara.
- Workshop *Workshop on New Developments in PDEs and Related Topics*, October 2018 in Napoli.

- Workshop *Optimal Transportation and Applications*, November 2018 in Pisa.
- Workshop *XXIX Convegno Nazionale di Calcolo delle Variazioni*, February 2019 in Levico Terme.
- Thematic Programme *Optimal Transport*, May 2019 in Vienna.
- Workshop *Crowds: Model and Control*, June 2019 in Luminy.
- Workshop *Singular nonlinear problems in Calculus of Variations and PDE's*, June 2019 in Napoli.
- Workshop *People in Optimal Transport and Applications*, June 2019 in Cortona.
- Winter School *Turbulence in fluids and PDEs* January 2020 in Lausanne.
- Workshop *XXX Convegno Nazionale di Calcolo delle Variazioni*, February 2020 in Levico Terme.

#### **Spoken languages**

1. Italian (mother tongue)
2. English (fluent)
3. German (professional)
4. French (professional)
5. Spanish (basic)

#### **IT Skills**

- *Operating systems*: Unix environment, Mac OS, Windows
- *Programming languages*: C, Matlab
- *Graphics Editor*: Inkscape, Xfig, Photoshop