



Daniele Cassani

Curriculum Vitae

Professional experience

- 2017–Present **Associate Professor of Mathematical Analysis**, DEPARTMENT OF SCIENCE AND HIGH TECHNOLOGY, Università degli Studi dell'Insubria, Como.
- 2016–Present **President of RISM**, RIEMANN INTERNATIONAL SCHOOL OF MATHEMATICS, villa Toeplitz - Varese, Scientific Board: E. Bombieri (IAS - Princeton), R. Donagi (Univ. Pennsylvania), I. Ekeland (Univ. Paris Dauphine), M. Hairer (Imperial College - London), L. Nirenberg (CIMS - NY), A. Quarteroni (Politecnico Milano & EPFL).
- Institutional appointments:**
- 2018–Present **Member of the Board of Directors** (Consiglio di Amministrazione) of the Università degli Studi dell'Insubria.
- Member of the Evaluation Committee** for the XXXIV call of the PhD program in *Informatica e Matematica del Calcolo*, Università degli Studi dell'Insubria.
- Member of the Managing Board** of the Seminario Matematico e Fisico di Milano.
- 2017–2018 **Member** of the University Counseling Committee (Commissione Orientamento).
- 2017 **Member** of the Committee for a comparative evaluation for Associate Professorship at Università degli Studi della Campania "Luigi Vanvitelli".
- 2016 **Member** of the Committee for the XXXII call of the PhD program in *Informatica e Matematica del Calcolo*.
- 2015 **Member** of the Ph.D. Commission for the final evaluation of XXVII-XXVIII round in "Matematica del Calcolo e Informatica", Università degli Studi dell'Insubria.
- 2015–2018 **Member** of the "Collegio di Disciplina (Disciplinary Board)" of the University of Insubria.
- Deputy Member** of the "Comitato Unico di Garanzia" of the University of Insubria.
- 2015–Present **Member** of the "FAR - Committee" for Mathematics, Computer Science and Engineering, in charge of managing research funds of the University.
- 2014–2016 **Deputy Director**, RISM.
- 2014–Present **Member** of the Managing Board of RISM.

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Member of the Managing Board of Ph.D. School in “Computer Science and Computational Mathematics”, Università degli Studi dell’Insubria.

2014 **Member** of the Committee for the XXX call of the PhD program in *Informatica e Matematica del Calcolo*.

Scientific appointments:

2017–Present **Visiting Professor**, CENTRO DE MATEMÁTICA, APLICAÇÕES FUNDAMENTAIS E INVESTIGAÇÃO OPERACIONAL, Universidade de Lisboa, Lisbon.

2012–2017 **Senior Research Fellow**, DEPARTMENT OF SCIENCE AND HIGH TECHNOLOGY, Università degli Studi dell’Insubria, Como.

2016 **Visiting Professor**, ZHEJIANG NORMAL UNIVERSITY, Jinhua, China.

Visiting Professor, OSAKA CITY UNIVERSITY, Japan.

2013 **Visiting Professor**, PONTIFÍCIA UNIVERSIDADE CATÓLICA DO RIO DE JANEIRO, Brazil.

2007–2011 **Lecturer**, DEP. OF MATHEMATICS, Politecnico di Milano, Faculty of Engineering.
Postdoctoral Research Fellow, DEPARTMENT OF MATHEMATICS, Università degli Studi di Milano.

2007 **Visiting Professor**, UNIVERSIDADE FEDERAL DE PARAIBA, Brazil.

2006–2007 **Postdoctoral Research Fellow**, PIMS, PACIFIC INSTITUTE FOR THE MATHEMATICAL SCIENCES, Director: Prof. Ivar Ekeland, The University of British Columbia, Vancouver, (Canada), Supervisor: Prof. Nassif Ghoussoub.

2001–2005 **PhD Scholarship**, UNIVERSITÀ DEGLI STUDI DI MILANO.

Other appointments:

1995–2000 Professional photographer, international experience.

Education

2005 **Ph.D. in Mathematics**, *Università degli Studi di Milano*, Advisor: Prof. Bernhard Ruf, Dissertation: *Nonlinear elliptic systems with critical growth*, Lambert Academic Publishing (2010), 70pp.

2001 **Master’s Degree in Mathematics**, *Univ. di Milano*, Summa cum laude.

Selected talks

2019 *Nonlinear Systems of Elliptic PDEs and Applications*, China-Italy Conference on Partial Differential Equations and Their Applications, Fudan University, Shanghai, China.

2018 *New Critical Phenomena in Nonlinear Nonlocal Schrödinger Equations*, Recent Advances in Nonlinear Analysis, CIRM Levico Terme - Trento.

Choquard type equations with Hardy-Littlewood-Sobolev upper- and lower-critical growth, Università di Roma la Sapienza.

Critical aspects of Choquard type equations, Politecnico di Milano.

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- 2017 *Critical and supercritical Hamiltonian systems of Schrödinger equations in dimension two*, Two-day meeting on PDEs, Perugia.
Critical and supercritical Hamiltonian systems of Schrödinger equations in dimension two, Mostly Maximum Principle, BIRS, Banff - Canada.
Nonlocal MEMS equations: from direct to inverse problems and back, Alfredo Lorenzi Analysis Seminar, University of Milano.
Nonlocal near to local MEMS equations, International Conference on Elliptic and Parabolic Problems, Gaeta.
Nonlocal Schrödinger equations with Hardy-Littlewood-Sobolev critical exponents, X Workshop on Nonlinear Differential Equations, University of Brasilia.
Choquard type equations with H-L-S critical growth, CMAF-CIO, Lisbon.
- 2016 *A priori estimates and semiclassical ground states for systems of critical Schrödinger equations in $\mathbb{R}^2$* , Zhejiang Normal University, Jinhua, China.
A nonlocal Schrödinger equation in dimension two, Osaka City University, Japan.
- 2015 *Pohozaev-Trudinger-Moser type inequalities via Zygmund spaces*, AMS, Spring Western Sectional Meeting, University of Nevada, Las Vegas.
Supercritical systems of Schrödinger equations in dimension two, Courant Institute of Mathematical Sciences, New York University.
Hamiltonian systems of Schrödinger equations with supercritical exponential growth, Università di Pisa.
- 2014 *Direct and inverse problems related to MEMS*, PDE's, Inverse Problems and Control Theory, Università degli Studi di Bologna.
Singular nonlinearities in PDE and applications to MEMS, AIMS Conference in Dynamical Systems, Differential Equations and Applications, Madrid.
Moser type inequalities in the whole plane and the zero mass case, AIMS Conference in Dynamical Systems, Differential Equations and Applications, Madrid.
- 2013 *Supercritical elliptic systems of Schrödinger equations in dimension two*, Università Mediterranea, Reggio Calabria.
- 2012 *A new insight into Moser's inequality*, Workshop on Nonlinear Differential Equations, Universidade Federal de Paraíba, Joao Pessoa, Brazil.
Group invariance and Pohozaev identity in Moser type inequalities, Workshop on Nonlinear Partial Differential Equations, Università degli Studi di Perugia.
- 2011 *A Moser inequality for the 1-bilaplacian*, Workshop on nonlinear PDEs and functional inequalities, Universidad Autonoma de Madrid.
Moser inequalities in Zygmund spaces, Università di Catania.
- 2010 *Borderline cases for second order Moser type inequalities*, Institut für Mathematik, Universität Basel.
On the L^1 -borderline case for second order Moser type inequalities, Università degli Studi di Milano Bicocca.
Fourth order PDE with singular nonlinearities and applications to MEMS, Università di Pisa.

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- 2008 *On a Moser inequality in Lorentz-Sobolev spaces and applications to elliptic systems in $\mathbb{R}^N$* , Università dell'Insubria, Como.
A Moser-type inequality in Lorentz-Sobolev spaces for unbounded domains, Liouville theorems and detours, Cortona.
- 2007 *Some function spaces new in PDE*, Workshop em Equações Diferenciais Parciais, Universidade Federal de Pernambuco, Recife, Brazil.
- 2006 *Nonlinear Elliptic Systems with Critical Growth*, PIMS seminars, University of British Columbia, Vancouver, Canada.
- 2005 *Remarks on a Serrin curve*, Scuola Normale Superiore, Pisa.

Chair teaching

- 2019–2020 **Topics in Advanced Analysis A**, Università degli Studi dell'Insubria, Master's Degree in Mathematics (Como).
Analisi Matematica A, Università degli Studi dell'Insubria, School of Engineering, Ingegneria per la Sicurezza del Lavoro e dell'Ambiente - ISLA (Varese).
- 2018–2019 **Advanced Analysis B**, Università degli Studi dell'Insubria, Master's Degree in Mathematics (Como).
Analisi Matematica A, ISLA (Varese).
- 2012–2018 **Analisi Matematica A**, ISLA (Varese).
Analisi Matematica B, ISLA (Varese).
- 2016–2017 **Advanced Analysis B**, Università degli Studi dell'Insubria (Como).
- 2014–2015 **Advanced Analysis B**, Master's Degree in Mathematics (Como).
- 2013–2014 **PhD course** on "Calculus of Variations and Applications", consorzio interuniversitario Me.S.E., Reggio Calabria.
- 2012–2013 **Analisi di Fourier**, Master's Degree in Mathematics (Como).
- 2011–2012 **Analisi Matematica 1 e Geometria**, Politecnico di Milano, School of Engineering, Ingegneria Gestionale.
PhD course on "Nonlocal higher order problems and applications to MEMS", Università Mediterranea di Reggio Calabria.
- 2010–2011 **Analisi Matematica 2**, Politecnico di Milano, Ing. dell'Informazione.
Analisi Matematica II, Politecnico di Milano, School of Eng., Ing. Gestionale.
Analisi Matematica e Geometria 2, Politecnico di Milano, Ing. Aerospaziale.
- 2009–2010 **Analisi Matematica II**, Politecnico di Milano, School of Eng., Ing. Gestionale.
Equazioni Differenziali, Politecnico di Milano, Ing. Civile e Ambientale.
Analisi Matematica 1, Politecnico di Milano, Ing. dell'Informazione.
Precorso di Matematica, Politecnico di Milano, School of Eng.
- 2008–2009 **Equazioni Differenziali alle Derivate Parziali**, Politecnico di Milano, School of Eng., Graduate course, Ing. Civile e Ambientale.
- 2007–2008 **Equazioni Differenziali Ordinarie** Politecnico di Milano, Ing. Civile e Ambientale.
Analisi Matematica B Politecnico di Milano, Ing. Civile e Ambientale.

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- PhD course** on “Lorentz spaces and PDE”, Universidade Federal de Paraiba (Joao Pessoa, Brasile) and Universidade Federal de Pernambuco (Recife, Brasile).
- 2006–2007 **MATH 200/253** (Multivariable Calculus), University of British Columbia, Vancouver, Canada: 2 terms.

Other professional contributions

PhD supervision:

- 2019–Present Lele Du, Zhejiang Normal University, *Advisor*.
- 2018–Present Marco Tarsia, Università di Pisa, *Tutor*.
- 2016–2019 Delia Schiera, Università degli Studi dell'Insubria, *Advisor*.

Postdoc supervision:

- 2019–Present Dr. Youjun Wang, South China University of Technology.
Luca Vilasi, Università di Messina.
- 2016–2018 Dr. Jianjun Zhang, College of Mathematics and Statistics, Chongqing Jiaotong University. Current position: Associate Professor in Mathematics.

Organization of Scientific Events:

- 2018–Present **Organizer** of the forthcoming congress *L'intreccio tra Matematica e Filosofia: occasioni o tentazioni?*, Università degli Studi dell'Insubria, Varese.
- Organizer** of the forthcoming congress *Advances and Challenges in Nonlinear Analysis and... Beyond! - On the occasion of Vieri Benci's 70th birthday*, Univ. degli Studi di Bari.
- Organizer** of the forth RISM course *Mostly Maximum Principle - by Italo Capuzzo Dolcetta*, RISM - villa Toeplitz, Varese.
- Organizer** of the forthcoming RISM congress *XI Brazilian–Italian workshop on Nonlinear Differential Equations*, Collegio C. Cattaneo, Varese.
- Organizer** of the forthcoming IISS *Modelling the Cardiac Function - iHeart* (Director: Alfio Quarteroni), villa Toeplitz, Varese.
- Organizer** of the workshop *Advances and Challenges in Nonlinear Elliptic Systems*, RISM, Varese.
- Organizer** of the sixth RISM school *RISM6 - Developments in stochastic Partial Differential Equations - in honour of Giuseppe Da Prato* (Director: Martin Hairer), Collegio C. Cattaneo, Varese (<http://www.rism.it>).
- Organizer** of the second RISM course *Some New and Old Problems in the Calculus of Variations - by Arrigo Cellina*, RISM - villa Toeplitz, Varese.
- Organizer** of the RISM workshop *New Advances in PDE - in honor of Anna Maria Micheletti's birthday*, RISM.
- Organizer** of the workshop *Mathematical Methods in Chemical Engineering and Beyond*, RISM.
- Organizer** of the forthcoming third RISM course *Generalized Solutions to Differential Equations: Theory and Applications - by Vieri Benci*, RISM.

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- 2017 **Organizer** of the workshop *RISM workshop in PDE - On the occasion of Daniela Lupo's 60th birthday*, RISM.
Organizer of the fifth RISM school *RISM5–Topological and Algebraic Advances in QFT* (Director: Ron Donagi), RISM.
Organizer of the workshop *Mathematical Methods for Digital Image Analysis and Processing*, RISM.
Organizer of the RISM course *Between discrete and continuous structures* by Umberto Mosco.
- 2016 **Organizer** of the workshop *Nonlinear PDE, inequalities and Applications*, RISM.
Organizer of the congress *French-Italian Meeting on Spectral Triples in Noncommutative Geometry*, RISM.
Organizer of the IISS *Recursion, Integrability, Geometry, and Mechanics*, RISM.
Organizer of the fourth RISM School on *Nonlinear Phenomena in Mathematics and Economics* (Director: Ivar Ekeland), Collegio C. Cattaneo, Varese.
- 2014 **Organizer** of the workshop *Optimal inequalities and PDE*, RISM.
Organizer of the congress *A meeting with Louis Nirenberg*, RISM.
- Editorial Activity:**
- 2009 **Collaborator** of *Ist. Enciclopedia Italiana fondata da G. Treccani*: author.
Collaborator of Garzanti publishing house: scientific supervisor.
- 2004–Present **Referee for:** *Acta Applicandae Mathematicae; Advances in Mathematical Physics; Advances in Nonlinear Analysis, Annali di Matematica Pura e Applicata; Applicable Analysis; Communications in Contemporary Mathematics; Discrete and Continuous Dynamical Systems; ESAIM: Control, Optimisation and Calculus of Variations; Journal of Fourier Analysis and Applications; Journal of Korean Mathematical Society; Journal of Mathematical Analysis and Applications; Journal of Mathematical Physics; International Journal of Nonlinear Sciences and Numerical Simulation; Mathematical Methods in Applied Sciences; Mathematische Annalen; Mathematische Nachrichten; Milan Journal of Mathematics; Nonlinear Analysis; Nonlinear Analysis: Real World Applications; Proceedings of the American Mathematical Society; Topological Methods in Nonlinear Analysis; Zeitschrift fuer Angewandte Mathematik und Physik.*
- Academic Memberships:**
- 2019–Present **Member** of the Istituto di Studi Superiori dell'Insubria "Gerolamo Cardano", www.cslinsubria.it
- 2014–Present **Co-founder and Member** of the Riemann International School of Mathematics, www.rism.it.
- 2001–Present **Member** of INdAM–GNAMPA (Istituto Nazionale di Alta Matematica–Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni), www.altamatematica.it/gnampa
- 2001–Present **Member** of *Seminario Matematico e Fisico di Milano*, www.mate.polimi.it/smf

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Research interests

Nonlinear Analysis and Calculus of Variations, PDE and systems of PDE and applications to MEMS (Micro-Electro-Mechanical-Systems). Best constants in limiting cases of Sobolev embeddings, Pohozaev-Trudinger-Moser type inequalities and Hardy type inequalities. Maximum principle, inverse problems, image processing.

Funds administration

- 2019 **Riemann Medal** - PI of the project "Institution of the International Prize Riemann Medal" under the patronage of all public and private universities of Lombardia.
- 2018 **FFABR** - awarded of national research funds for fundamental research.
- 2014–Present **RISM** - PI of national and international research grants.
- 2012–Present **FAR** - full budget from University Research Funds.
- 2007–Present **Supported** by Brazilian research grants.
- 2001–Present **Supported** by the national group GNAMPA.
- 2015–2016 **Supported** by Japanese research grants.
- 2011 **Supported** by the international Italia–Spagna integrated action program.
- 2004–2012 **Supported** by national research funds PRIN.

Bibliographic indicators:

- Mathscinet: 25 papers, Citations 237, H-index 9.
- Scopus: 25 papers, Citations 271, H-index 10.
- WOS: 24 papers, Citations 256, H-index 9.
- Google Scholar: 33 papers, Citations 384, H-index 12.

Publications

1. D. Cassani, *Existence and non-existence of solitary waves for the critical Klein–Gordon equation coupled with Maxwell's equations*, Nonlinear Analysis **58** (2004), 733–747.
2. D. Cassani, *Remarks on a 'Serrin curve' for systems of differential inequalities*, Rend. Ist. Lombardo Cl. Sci. Mat. Nat. **140** (2006), 115–126 (2008).
3. D. Cassani, J.M. do Ó and N. Ghoussoub *On a fourth order elliptic problem with a singular nonlinearity*, Adv. Nonlinear Stud. **9** (2009), 189–209.
4. D. Cassani, *Lorentz-Sobolev spaces and systems of Schrödinger equations in $\mathbb{R}^N$* , Nonlinear Analysis **70** (2009), 2846–2854.
5. D. Cassani and C. Tarsi, *A Moser-type inequality in Lorentz-Sobolev spaces for unbounded domains in $\mathbb{R}^N$* , Asymptotic Analysis **64** (2009), 29–51.
6. D. Cassani, B. Kaltenbacher and A. Lorenzi *Direct and inverse problems related to MEMS*, Inverse Problems **25** (2009), 105002 (22pp).
7. D. Cassani, B. Ruf and C. Tarsi, *Best constants for Moser type inequalities in Zygmund spaces*, Matemática Contemporânea **36** (2009), 79–90.

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8. D. Cassani, J.M. do Ó and A. Moameni, *Existence and concentration of solitary waves for a class of quasilinear Schrödinger equations*, Commun. Pure Appl. Anal. **9** (2010), 281–306.
9. D. Cassani, B. Ruf and C. Tarsi *Best constants in a borderline case of second order Moser type inequalities*, Ann. Inst. H. Poincaré Anal. Non Linéaire **27** (2010), 73–93.
10. E. Berchio, D. Cassani and F. Gazzola *Hardy-Rellich inequalities with boundary remainder terms and applications*, Manuscripta Mathematica **131** (2010), 427–458.
11. D. Cassani, L. Fattorusso and A. Tarsia, *Global existence for nonlocal MEMS*, Nonlinear Analysis **74** (2011), 5722–5726.
12. D. Cassani, B. Ruf and C. Tarsi, *Group invariance and Pohozaev identities in Moser type inequalities*, Comm. Contemp. Math. **15** (2013), 1250054 (20pp).
13. D. Cassani, B. Ruf and C. Tarsi, *Optimal Sobolev-type inequalities in Lorentz spaces*, Potential Analysis **39** (2013), 265–285.
14. D. Cassani, B. Ruf and C. Tarsi, *A Moser type inequality in Zygmund spaces without boundary conditions*, Contemporary Mathematics **595** (2013), Recent Trends in Nonlinear Partial Differential Equations II: Stationary Problems, (22pp).
15. D. Cassani, L. Fattorusso and A. Tarsia, *Nonlocal dynamic problems with singular nonlinearities and applications to MEMS*, Progress in Nonlinear Differential Equations and their Applications, Birkhäuser (2014), (22 pp).
16. Z.-J. Bai, D. Cassani, M. Donatelli and S. Serra Capizzano, *A Fast Alternating Minimization Algorithm for Total Variation Deblurring Without Boundary Artifacts*, J. Math. Anal. Appl. **415** (2014), 373–393.
17. D. Cassani, F. Sani and C. Tarsi, *Equivalent Moser type inequalities in $\mathbb{R}^2$ and the zero mass case*, J. Funct. Anal. **267** (2014), 4236–4263.
18. D. Cassani and C. Tarsi, *Existence of solitary waves for supercritical Schrödinger systems in dimension two*, Calc. Var. Partial Differential Equations **54** (2015), 1673–1704.
19. D. Cassani and A. Tarsia, *Periodic solutions to nonlocal MEMS equations*, Discrete Contin. Dyn. Syst. Ser. S. **9** (2016), pp. 631–642.
20. C. Alves, D. Cassani, C. Tarsi and M. Yang, *Existence and concentration of ground state solutions for a critical nonlocal Schrödinger equation in $\mathbb{R}^2$* , Journal of Differential Equations **261** (2016), 1933–1972.
21. D. Cassani, J.M. do Ó and Jianjun Zhang, *Multi-bump solutions for singularly perturbed Schrödinger equations in $\mathbb{R}^2$ with general nonlinearities*, Topol. Methods Nonlinear Anal. **49** (2017), 205–231.
22. D. Cassani and J. Zhang, *A priori estimates and positivity for semiclassical ground states for systems of critical Schrödinger equations in dimension two*, Comm. Partial Differential Equations **42** (2017), 655–702.
23. D. Cassani, B. Ruf and C. Tarsi, *On the capacity approach to non-attainability of Hardy's inequality in $\mathbb{R}^n$* , Discrete Contin. Dyn. Syst. Ser. S. **12** (2019), 245–250.

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24. D. Cassani, B. Ruf and C. Tarsi, *Equivalent and attained version of Hardy's inequality in $\mathbb{R}^n$* , J. Funct. Anal. **275** (2018), 3303–3324.
25. D. Cassani, J. Van Schaftingen and J. Zhang, *Groundstates for Choquard type equations with Hardy–Littlewood–Sobolev lower critical exponent*, to appear in Proc. Roy. Soc. Edinburgh Sect. A., DOI:10.1017/prm.2018.135
26. D. Cassani and J. Zhang, *Choquard type equations with Hardy–Littlewood–Sobolev upper-critical growth*, Adv. Nonlinear Anal. **8** (2019), 1184–1212.
27. D. Cassani, Z. Liu, C. Tarsi and J. Zhang, *Multiplicity of sign-changing solutions for Kirchhoff type equations*, to appear in Nonlinear Anal.
28. D. Cassani, C. Tarsi and J. Zhang, *Bounds for best constants in subcritical Sobolev embeddings*, Submitted 2018.
29. D. Cassani, H. Tavares and J. Zhang, *Bose fluids and positive solutions of weakly coupled systems with critical growth in dimension two*, Submitted 2018.

Survey papers

30. Series *Le Garzantine*, MATEMATICA, Garzanti (2014), pp. 1536. Editors: Maraschini–Palma, Scientific Revisor: D. Cassani. ISBN 978-88-11-50525-9
31. D. Cassani, L. Fattorusso and A. Tarsia, *Nonlocal singular problems and applications to MEMS*, IAENG, Proceedings of the World Congress on Engineering Vol. **II** (2013).
32. D. Cassani, Lemmi: *equazione di Euler-Lagrange; Equazioni ellittiche non lineari; Metodo del moving plane; Metodo di concentrazione-compattatezza; Principio variazionale; Problemi di omogeneizzazione; Punti stazionari*, Enciclopedia della Scienza e della Tecnica, vol. VI, Ist. Enciclopedia Italiana fondata da G. Treccani (2008).

Preprints and papers in preparation

33. D. Cassani, F. Messina, T. Miyasita and A. Tarsia, *A Brezis-Cazenave type result and the pull-in instability conjecture for MEMS equations*.
34. D. Cassani and C. Tarsi, *Choquard type equations in dimension two*.
35. D. Cassani, D. Schiera and J. Zhang *Uniqueness and non-degeneracy of groundstates for Choquard type equations*.
36. D. Cassani and D. Schiera, *Uniqueness results for higher order Lane-Emden type systems*.
37. D. Cassani and A. Tarsia, *Maximum principle for higher order operators in general domains*.
38. D. Cassani, D.D. Felix and E.S. Medeiros, *Embedding of $W_\gamma^{1,p}(\mathbb{R}^2)$ into Orlicz spaces and applications*.
39. D. Cassani and C. Tarsi, *Supercritical Hamiltonian elliptic systems on bounded domains in dimension two*.
40. D. Cassani, J.M. Do Ó and J. Zhang, *Critical and supercritical Hamiltonian systems of PDE in bounded domains*.

Varese, April 2019

Signature: Daniele Cassani

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