Curriculum vitæ
with list of publications

Tonia Ricciardi

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PERSONAL

Name (given/FAMILY): Tonia RICCIARDI

Date/place of birth: July 19, 1969. Naples, Italy

Country of citizenship: Italy

Status: Married to Giuseppe R. BIMONTE; three children

Current position: Associate professor of mathematical analysis, Federico II University, Naples (Italy)

Address: Dipartimento di Matematica e Applicazioni, Università di Napoli Federico II, Via Cintia, 80126 Napoli, Italy

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Languages: Italian, English, French, German, Japanese

Reviewer for Mathematical Reviews.

EDITORIAL BOARD MEMBERSHIP Editor of Scientiae Mathematicae Japonicae (http://www.jams.or.jp).

EDUCATION

March 22, 1999: *Dottorato di Ricerca* in Applied Mathematics, Università di Napoli Federico II.
Thesis: "Nonlinear Elliptic Problems in Chern-Simons Gauge Theory".
Supervisor: Prof. G. Tarantello

July 12, 1993: *Laurea con lode* in Mathematics, Università di Napoli Federico II.
Thesis: "Simmetrizzazione e regolarità per soluzioni di equazioni ellittiche".
Supervisor: Prof. G. Trombetti

EMPLOYMENT

November 3, 2009: Associate professor of mathematical analysis, Università di Napoli Federico II

June 23, 2006: Qualification for associate professorship of mathematical analysis for Italian state universities (Italian: idoneità in valutazione comparativa per professore di II fascia, ssd MAT/05)

June 1, 1999 to present: *Ricercatore confermato*, Università di Napoli Federico II

October 1, 1998–May 31, 1999: *Ricercatore confermato*, Università della Basilicata (Potenza, Italy)

October 1, 1995–September 30, 1998: *Ricercatore*, Università della Basilicata (Potenza, Italy)

CAREER BREAK   I have been on maternity leave for a total of 15 months (5 months in 2003, 5 months in 2005 and 5 months in 2009).

LONG-TERM VISITS

September 1999–July 2001: Visiting Scholar, Rutgers University Mathematics Department (supervisor: Professor Y.Y. Li).

January–June 1994: Research Student, Department of Mathematics, Kyoto University (supervisor: Professor N. Iwasaki).

SHORT-TERM VISITS

28 June 2011–6 September 2011: Osaka University (Japan), on invitation of Professor T. Suzuki.

20 February 2011–25 February 2011: University of Crete (Heraklion, Greece), on invitation of Professor G. Karali.

22 June 2008–28 June 2008: Osaka University (Japan), on invitation of Professor T. Suzuki.

7 April–11 April 2008: University of Crete (Heraklion, Greece), on invitation of Professor G. Karali.

14 June–17 June 2007: Osaka University and Osaka City University (Japan), on invitation of Professor T. Suzuki and Professor F. Takahashi (supported by JSPS).

GRANTS

2010-2014: Marie Curie Project IRSES-2009-247486 *Mathematical studies on critical non-equilibrium phenomena via mean field theories and theories of nonlinear partial differential equations* financed by the European Commission within the Seventh Framework Project (Euro 176000).

2010: Project financed by GNAMPA-Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le Applicazioni with title *Nonlinear elliptic problems: problems in theory and in applications*

2003: Regione Campania grant L.R. 5/02–Annualità 2002 for the project *Alcuni problemi ellittici non lineari in Geometria e in Fisica: questioni di esistenza, asintotica e blow-up* (Euro 4.725,00)

2002: CNR[1] award for work carried out under Fellowship 203.01.69 (19/01/98)

1999: MURST[2] grant for young researchers (*Progetto Giovani Ricercatori*)

1998: CNR Fellowship 203.01.69 (19/01/98) for postdoctoral studies abroad (*borsa senior per l'estero*)

May–November 1993: CNR Fellowship 209.01.57 (13/07/92) for undergraduate studies (*borsa per laureandi*)

November 1, 1993 – September 30, 1995: Università di Napoli Federico II doctorate program fellowship.

POST-DOCTORAL SUPERVISION   Fernando Farroni (November 2010-October 2011)

SCHOOLS AND SUMMER COURSES

October 1998: Third school on nonlinear functional analysis and applications to differential equations, Abdus Salam ICTP, Trieste, Italy.

April–May 1997: Second school on nonlinear functional analysis and applications to differential equations. ICTP, Trieste, Italy.

April–May 1996: School on nonlinear functional analysis and applications to differential equations. ICTP, Trieste, Italy.

September 1995: School on elliptic equations and applications to differential geometry. ICTP, Trieste, Italy.

July 1995: Scuola Matematica Interuniversitaria, Cortona, Italy. Course: Elliptic equations, Prof. N. Krylov and Prof. E. Lanconelli.

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[1] Italian National Research Council
[2] Italian Ministry of University, Research, Science and Technology

July–August 1994: Corso Estivo di Matematica, Perugia, Italy.
Courses: Complex Analysis, Prof. T. Gamelin; Differential Equations, Prof. S. Jensen.

July–August 1993: Corso Estivo di Matematica, Perugia, Italy.
Courses: Complex Analysis, Prof. T. Steger; Functional Analysis, Prof. S. Prössdorf

MEETINGS AND WORKSHOPS

Invited talks

Quantization Blow-up and Concentration in Mathematical Physics View Point, Osaka, 26–28 March 2013.
Titolo: "On some mean field equations including probability measures motivated by 2D turbulence."

Modern approach and developments to Onsager's theory of statistical vortices, Kyoto 28–31 August 2011. Cofinanziato dal Research Institute for Mathematical Sciences di Kyoto University nell'ambito del progetto FP7–MC–IRSES–2009–247486.
Titolo: "Blow-up analysis and optimal Trudinger-Moser inequalities for some mean field equations in statistical hydrodynamics."

International Conference on Nonlinear Partial Differential Equations and Applications, University of Science and Technology of China, Hefei (R.P. Cina) 1–4 August 2011.
Titolo: "Blow up analysis and a Trudinger-Moser inequality for a mean field equation arising in 2D turbulence."

Mathematical Challenges Motivated by Multi-Phase Materials: Analytical, Stochastic and Discrete Aspects, Anogia (Crete, Greece), 21–26 June 2009.
Title:"On the convergence of a fourth order evolution equation to the Allen-Cahn equation".

Problems in the calculus of variations and related topics, Research Institute for Mathematical Sciences, Kyoto University (Giappone), 23–25 June 2008.
Title:"A Moser-Trudinger inequality from two-dimensional turbulence".

Variational Problems and Related Topics, Research Institute for Mathematical Sciences, Kyoto University (Japan), 19–21 June 2007.
Title: "An elliptic equation with exponential nonlinearities from two-dimensional turbulence".

Variational Methods and Nonlinear Differential Equations, on the occasion of the 60th birthday of Professor Antonio Ambrosetti, Università Roma Tre, Roma, 10–14 January 2005.
Title: "On some nonlinear, two-dimensional elliptic equations from self-dual gauge theories"

Dynamics of patterns in reaction-diffusion systems and the related topics, Research Institute for Mathematical Sciences, Kyoto (Japan), 25–28 November 2002.

Title: "A nonlinear elliptic system from Maxwell-Chern-Simons vortex theory"

Calculus of Variations in Nonlinear Phenomena, Martina Franca (Italy), 23–27 September 2002.
Title: "Sharp Sobolev inequalities involving scalar curvature"

Nonlinear Functional Analysis, ICM 2002-Beijing Satellite Conference, Taiyuan (P.R. China), 14–18 August 2002.
Title: "Asymptotics for a nonlinear elliptic system"

Singular Limit Analysis of Reaction-Diffusion Systems, L'Aquila (Italy), 8–10 July 2002.
Title: "Asymptotics for a class of systems of nonlinear elliptic equations"

AMS-UMI First Joint International Meeting, Special Session on Nonlinear elliptic and parabolic equations and systems: solvability of boundary value problems and regularization of solutions, Pisa (Italy), 12–16 June 2002.
Title: "Sharp Sobolev inequalities involving scalar curvature"

Systèmes de réaction-diffusion et propagation de fronts en biologie, Université Paris-Sud, Orsay (France), 21–22 March 2002.
Title: "An elliptic system with exponential nonlinearities"

Singularities and Concentration Phenomena in Elliptic and Parabolic PDE's, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach (Germany), 27 January–2 February 2002.
Title: "Sharp Sobolev Inequalities on Riemannian manifolds".

Spring Sectional Meeting of the AMS, Hoboken, NJ, 28–29 April 2001. Special Session on Singular and Degenerate nonlinear elliptic problems.
Title: "A new best Sobolev inequality on Riemannian manifolds".

Fall Sectional Meeting of the AMS, Columbia University, New York, 4–5 November 2000. Special Session on Nonlinear Partial Differential Equations.
Title: "Asymptotics for Maxwell-Chern-Simons multivortices".

Summer Symposium on Partial Differential Equations, Nagano (Japan), 4–7 July 1998.
Title: "Vortex condensates in the Maxwell-Chern-Simons-Higgs theory"

On the Structure of Solutions of Partial Differential Equations, Kyoto, 4–7 November 1996.
Title: "On a periodic boundary value problem with exponential nonlinearities"

Contributed talks

Analysis, PDE's and Applications, On the occasion of the 70th birthday of Professor Vladimir Maz'ya, Roma, 30 June-3 July 2008.
Title: "On the Hölder continuity of solutions of two-dimensional elliptic equations".

Variational Analysis and Partial Differential Equations, Ettore Majorana Centre for Scientific Culture, Erice (TP), 5–14 July 2006.
Title: "Some sharp Hölder estimates for two-dimensional elliptic equations".

XVII Congresso dell'Unione Matematica Italiana, Milano, 8–13 September 2003.
Title: "Sistemi ellittici nonlineari nella teoria di vortici di Maxwell-Chern-Simons".

International Congress of Mathematicians 2002, Beijing (P.R. China), 20–28 August 2002.
Title: "Asymptotics for a nonlinear elliptic system".

Posters

The Renato Caccioppoli Centenary Conference, Università di Napoli Federico II, 23–25 September 2004.
Title: "Sharp Hölder exponent for some elliptic equations in two variables".

Nonlinear Analysis 2000, Courant Institute, New York University, 28 May–2 June 2000.
Title: "Vortices in the Maxwell-Chern-Simons Theory".

Attended

Workshop on Thin Structures, Napoli, 15–17 September 2005.

Spring Sectional Meeting of the AMS, Lowell, Massachusetts, 1–2 April 2000.

Équations aux dérivées partielles; modélisation des phases quantiques condensées et milieux réactifs, NATO-ASI Cargèse, France, 21 June–2 July 1999

Recent Advances in Partial Differential Equations (A tribute to G. Stampacchia on the 20th anniversary of his death), Roma, 4–8 May 1998

On the Structure of Solutions of Partial Differential Equations, Kanuma (Japan), 30 August–1 September 1997

Florence 96, (Meeting organized by Courant Institute for Mathematical Sciences in the occasion of the 70-th birthday of P. Lax e L. Nirenberg), Firenze, 3–6 June 1996

Integral Inequalities and Nonlinear Variational problems, Ischia, 3–6 June 1995

Recenti contributi alla teoria delle equazioni differenziali e del calcolo delle variazioni, Festshrift for Professor C. Ciliberto, Napoli, 25–26 May 1995

Elliptic and Parabolic Partial Differential Equations, Capri, 19–23 September 1994

On the Cauchy problem for PDE's, Osaka, 24 May 1994

On the structure of solutions of PDE's, Kyoto, 16–18 February 1994

Nonlinear PDE's and Applications - A joint symposium of Japan and Taiwan, Kyoto, 12–15 January 1994

SEMINARS I have regularly given talks at the Mathematics Departments in Potenza and Naples. The following is a list of invited talks in other universities, on invitation of the professors indicated in brackets.

University of Crete (Heraklion, Grecia), 24 febbraio 2011 (Prof. G. Karali). Titolo: "On a mean field equation from two-dimensional turbulence and a related Moser-Trudinger inequality".

Università di Roma "Tor Vergata", February 10, 2009 (Prof. G. Tarantello). Differential Equations seminar talk: "Analisi di blow-up per un'equazione ellittica nonlineare motivata dalla turbolenza bidimensionale".

Osaka University (Japan), 27 June 2008 (Prof. T. Suzuki). Title: "A Moser-Trudinger inequality from 2D turbulence".

University of Crete (Heraklion, Greece), 10 April 2008 (Prof. G. Karali). Titolo: "Multiple solutions for a fourth-order elliptic equation from Maxwell-Chern-Simons vortex theory".

Osaka University (Japan), 15 June 2007 (Prof. T. Suzuki). Title: "An eigenvalue problem motivated by two-dimensional turbulence".

Università di Roma "La Sapienza", May 7, 2007 (Prof. M. Grossi). Differential Equations Seminar talk: "Su un'equazione ellittica a nonlinearità esponenziale motivata dalla turbolenza".

Università di Roma "La Sapienza", November 4, 2002 (Prof. A. Tesei). Differential Equations Seminar talk: "Sistemi ellittici nella teoria di Maxwell-Chern-Simons".

Xi'an Jiaotong University, Xi'an (P.R. China), August 29, 2002 (Prof. Z. Ma). Title of talk: "Asymptotics for a nonlinear elliptic system".

Università di Roma "Tor Vergata", December 18, 2001 (Prof. G. Tarantello). Differential Equations seminar talk: "Sharp Sobolev inequalities on Riemannian manifolds".

University of Connecticut, Storrs, CT, May 7, 2001 (Prof. J. McKenna). Differential Equations Seminar talk: "Some nonlinear elliptic problems in Chern-Simons gauge theory".

Rutgers University, New Brunswick, NJ, May 1, 2001 (Prof. Y.Y. Li). Nonlinear Analysis Seminar talk: "A new best Sobolev inequality on Riemannian manifolds".

Courant Institute, New York, April 5, 2001 (Prof. J. Shatah). Analysis Seminar talk: "Optimal Sobolev inequalities on Riemannian manifolds".

Brooklyn Polytechnic, New York, March 22, 2001 (Prof. Y.S. Yang and Prof. L. Sibner).
Colloquium talk: "Optimal Sobolev inequalities on Riemannian manifolds".

Universidad Nacional Autónoma de México, Mexico City, May 11, 2000 (Prof. P. Padilla).
PDE Seminar: "Multivortices in the Maxwell-Chern-Simons theory".

Università di Roma "Tor Vergata", December 12, 1996 (Prof. G. Tarantello).
Differential Equations seminar talk: "Un problema periodico con nonlinearità di tipo esponenziale".

REFEREEING EXPERIENCE   I have refereed for the following journals:

Proceedings of the Royal Society of Edinburgh A

Communications on Pure and Applied Mathematics

Asymptotic Analysis

SIAM Journal of Mathematical Analysis

Letters in Mathematical Physics

Communications of the Korean Mathematical Society

International Journal of Mathematics and Mathematical Sciences

PARTICIPATION IN COMMITTEES

Member of the committee for the final exam for doctorate degree of Dr. Massimiliano Carosi, Università di Roma "Tor Vergata" (D.R. n. 1789, 20/6/07).

HOBBIES   Classical music. In July 1989 I received the *Diploma in pianoforte* at "San Pietro a Majella" Conservatory in Naples, and I have attended several piano master courses in Freiburg (Germany) and Rouen (France).

List of publications and summaries

PUBLICATIONS

articles on journals

[**25**] T. Ricciardi and G. Zecca, On Neri's mean field equation with hyperbolic sine vorticity distribution, in corso di stampa su Scientiae Mathematicae Japonicae

[**24**] T. Ricciardi and T. Suzuki, Duality and best constant for a Moser-Trudinger inequality involving probability measures, in corso di stampa su Jour. European Math. Soc. (JEMS)

[**23**] T. Ricciardi e G. Zecca, On the continuity of solutions to degenerate elliptic equations in two dimensions. Potential Analysis **37**, No. 2 (2012), 171–185.

[**22**] T. Ricciardi e G. Zecca, Blow-up analysis for some mean field equations involving probability measures from statistical hydrodynamics. Differential Integral Equations **25**, No. 3–4 (2012), 201–222.

[**21**] H. Ohtsuka, T. Ricciardi and T. Suzuki, Blow-up analysis for an elliptic equation describing stationary vortex flows with variable intensities in 2D-turbulence. J. Differential Equations **249** (2010) 1436–1465.

[**20**] G. Karali and T. Ricciardi, On the convergence of a fourth order evolution equation to the Allen-Cahn equation. Nonlin. Anal. TMA **72** (2010) 4271–4281.

[**19**] F. Farroni, R. Giova and T. Ricciardi, Best constant and extremals for a vector Poincaré inequality with weights. Scientiae Math. Japonicae **71**, No. 2 (2010), 111–126; e-2010 53–68.

[**18**] (with R. Giova) A sharp Wirtinger inequality and some related functional spaces, to appear on Bull. Belgian Math. Soc. Simon Stevin. Available on-line at arXiv:math.AP/08031557.

[**17**] (with F. Chiacchio) Some sharp Hardy inequalities on spherically symmetric domains, Pac. J. Math. **242** No. 1 (2009), 173-187. Preprint Dip. Matematica e Appl. 37-2008.
arXiv:math.AP/08074692.

[**16**] On the best Hölder exponent for two dimensional elliptic equations in divergence form, Proc. Amer. Math. Soc. **136** (2008), 2771–2783.

[**15**] On planar Beltrami equations and Hölder regularity, Ann. Acad. Sci. Fenn. Math. **33** (2008), 143–158.

[**14**] (with F. Chiacchio) Multiple vortices for a self-dual $CP(1)$ Maxwell-Chern-Simons model, NoDEA Nonlinear differ. equ. appl. **13** (2007) 563–584.

[**13**] Mountain pass solutions for a mean field equation from two-dimensional turbulence, Diff. Int. Eqs. **20** No. 5 (2007), 561–575. Submitted by T. Suzuki.

[**12**] (with M. Macrì and M. Nolasco) Asymptotics for selfdual vortices on the torus and on the plane: a gluing technique, SIAM J. Math. Anal. **37** No. 1 (2005), 1–16.

[**11**] A sharp weighted Wirtinger inequality, Boll. U.M.I. (8) **8-B** (2005), 259–267.

[**10**] A sharp Hölder estimate for elliptic equations in two variables, Proc. Roy. Soc. Edinburgh **135A** (2005), 165–173.

[**9**] Multiplicity for a nonlinear fourth order elliptic equation in Maxwell-Chern-Simons vortex theory, Diff. Int. Eqs, **17** Nos. 3–4 (2004), 369–390. Submitted by H. Brezis.

[**8**] On a nonlinear elliptic system from Maxwell-Chern-Simons vortex theory, Asympt. Anal., **35** No. 2 (2003), 113–126.

[**7**] (with Y.Y. Li) A sharp Sobolev inequality on Riemannian manifolds, Comm. Pure Appl. Anal. **2** No. 1 (2003), 1–31. Abridged version in C. R. Acad. Sci. Paris, Ser. I 335 (2002), 519–524.

[**6**] Asymptotics for Maxwell-Chern-Simons multivortices, Nonlin. Anal. T.M.A. **5**0 No. 8 (2002), 1093–1106.

[**5**] (with G. Tarantello) Vortices in the Maxwell-Chern-Simons theory, Comm. Pure Appl. Math. **53** No. 7 (2000), 811–851.

[**4**] (with G. Tarantello) On a periodic boundary value problem with exponential nonlinearities, Diff. Int. Eqs. **1**1 No. 5 (1998), 745–753.

[**3**] (with G. Karch) Note on Lorentz Spaces and Differentiability of Weak Solutions to Elliptic Equations, Bull. Pol. Ac.: Math., **48**, No. 1 (1997), 111–116.

[**2**] (with A. Alberico) Continuity properties for linear elliptic equations with lower-order terms, Rend. Ac. Sci. Fis. Mat. Napoli, **LXIII** (1996), 7–16.

[**1**] A limit case for a nonlinear elliptic Dirichlet problem, Rend. Ac. Sci. Fis. Mat. Napoli, **LXI** (1994), 1–8.

submitted preprints

(with F. Farroni and R. Giova) Best constant and extremals for a vector Poincaré inequality with weights.

(with G. Karali) On the convergence of a fourth order evolution equation to the Allen-Cahn equation.

(with H. Ohtsuka and T. Suzuki) Blow-up analysis for an elliptic equation describing stationary vortex flows with variable intensities in 2D-turbulence.

proceedings

[P7] (with G. Karali) Existence and asymptotics for a Cahn-Hilliard/Allen-Cahn parabolic equation, *Problems in the calculus of variations and Related Topics*, Research Institute for Mathematical Sciences, Kyoto University, 23–25 June 2008. Sūrikaisekikenkyūsho Kōkyūroku No. 1628 (2008), 87–100.

[P6] A remark on the mean field equation for equilibrium vortices with arbitrary sign. *Variational Problems and Related Topics*, Research Institute for Mathematical Sciences, Kyoto University, June 19–21, 2007. Sūrikaisekikenkyūsho Kōkyūroku No. 1591 (2008), 159–163.

[P5] Some sharp Hölder estimates for two-dimensional elliptic equations. *Variational Analysis and Partial Differential Equations*, International Centre for Scientific Culture "E. Majorana", Erice (TP), July 5-14, 2006. J. Glob. Optim. **40** (2008), 399–403.

[P4] Sharp Hölder exponent for some elliptic equations in two variables. Proceedings of *The Renato Caccioppoli Centenary Conference*, Università di Napoli Federico II, September 23–25, 2004. Ricerche Mat. Vol. LIV, fasc. 2° (2005), 649–654.

[P3] Some nonlinear elliptic problems from Maxwell-Chern-Simons vortex theory. *Conference on Dynamics of Patterns in Reaction-Diffusion Systems and the Related Topics*, Research Institute for Mathematical Sciences, Kyoto University, November 25–28. 2002. Sūrikaisekikenkyūsho Kōkyūroku No. 1130 (2003), 124–133.

[P2] Asymptotics for some nonlinear systems in Maxwell-Chern-Simons vortex theory. *Topological Methods, Variational Methods and their Applications*, Proceedings of *The ICM 2002 Satellite Conference on Nonlinear Functional Analysis*, Taiyuan, China August 14–18, 2002, H. Brezis, K.C. Chang, S.J. Li and P. Rabinowitz eds., World Scientific, 2003, 201–209.

[P1] Sharp Sobolev inequalities involving scalar curvature. Proceedings of *The First AMS–UMI Joint Meeting*, Pisa (Italy), June 12–16, 2002, G. Lieberman and A. Maugeri eds. Commun. Appl. Nonlin. Anal. **10** No. 2 (2003), 9–18.

other

Problemi ellittici nonlineari nella teoria di gauge di Chern-Simons, doctoral thesis; summary in Boll. U.M.I. Serie VIII, Vol. III-A, Supplemento ad Aprile 2000, 193–196.

SUMMARIES

summaries of the articles on journals and preprints

[**P1**] We use a shadowing-type lemma in order to analyze the singular, semi-linear elliptic equation describing static self-dual abelian Higgs vortices. Such an approach allows us to construct new solutions having an *infinite* number of arbitrarily prescribed vortex points. Furthermore, we obtain the precise asymptotic profile of the solutions in the form of an approximate superposition rule, up to an error which is exponentially small.

[**11**] We prove a sharp Hölder estimate for solutions of linear two-dimensional, divergence form elliptic equations with measurable coefficients, such that the matrix of the coefficients is symmetric and has *unit determinant*. Our result extends some previous work by Piccinini and Spagnolo. The proof relies on a sharp Wirtinger type inequality.

[**10**] We prove the existence of at least two doubly periodic vortex solutions for a self-dual $CP(1)$ Maxwell-Chern-Simons model with vortex points of *either sign*. To this end, we extend the method introduced in [9] to the case of solutions unbounded from above.

[**9**] We prove the existence of at least two solutions for a fourth order equation, which includes the vortex equations for the $U(1)$ and $CP(1)$ self-dual Maxwell-Chern-Simons models as special cases. Our method is variational, and it relies on an "asymptotic maximum principle" property for a special class of supersolutions to this fourth order equation.

[**8**] We define an abstract nonlinear elliptic system, admitting a variational structure, and including the vortex equations for some Maxwell-Chern-Simons gauge theories as special cases. We analyze the asymptotic behavior of its solutions, and we provide a general simplified framework for the asymptotics previously derived in those special cases. As a byproduct of our abstract formulation, we also find some new qualitative properties of solutions.

[**7**] We prove an optimal Sobolev inequality on compact Riemannian manifolds without boundary, which improves a theorem of Hebey-Vaugon, and clarifies the role of scalar curvature in this context. Our inequality may also be viewed as a lower bound for the Yamabe functional. The proof is based on a blow-up analysis of approximate minimizers, which satisfy some nonlinear elliptic equations with critical growth.

[**6**] We complete the asymptotic analysis initiated in [5], where convergence is obtained only in the L^2-sense, by showing that it holds in C^q, for all $q \geq 0$. The main ingredient is an identity (derived from the self-dual structure of the model), which yields suitable energy estimates.

[**5**] We consider a system of two nonlinear elliptic equations defined on the flat 2-torus, whose solutions correspond to multi-vortex configurations for a Maxwell-Chern-Simons gauge theory. Such a system may also be viewed as a singular perturbation of a scalar elliptic equation. By variational techniques, we prove multiple existence of solutions. Furthermore, we consider

the asymptotics as the parameters tend to some physically relevant critical values, and provide a rigorous justification of some physical heuristics.

[**4**] We consider a nonlinear Sturm-Liouville problem with exponential nonlinearity, under periodic boundary conditions. Its solutions correspond to one-dimensional solutions for an elliptic equation, defined on the flat 2-torus. We prove multiple existence of solutions above the first eigenvalue, as well as uniqueness of the trivial solution below the first eigenvalue. Uniqueness implies that the solutions obtained by Struwe-Tarantello for the elliptic equation are strictly two-dimensional.

[**3**] We prove differentiabilty a.e. of solutions to elliptic equations, whose "source terms" belong to suitable Lorentz spaces. It is known that these solutions are generally not Hölder-continuous. Therefore, differentiability a.e. of weak solutions to elliptic equations is independent of their Hölder-continuity, which proves a conjecture by Bojarski.

[**2**] We provide sufficient conditions for boundedness and (simple) continuity for solutions to linear elliptic equations with lower-order terms, in the framework of Lorentz spaces. Degenerate cases are also considered.

[**1**] For a nonlinear elliptic Dirichlet problem with coefficients in logarithmic spaces, we provide a sufficient condition for the existence of a solution in the "limit" space $W_0^{1,n}$.

Teaching experience

I collaborated to the teaching of courses including Basic and Advanced Calculus, Complex Analysis, Measure Theory, Functional Analysis.

DETAILED DESCRIPTION (IN ITALIAN)

a.a. 2013–2014 Titolare del corso di Matematica, c.l. triennale in Biologia Generale e Applicata (8 crediti); affidamento del corso di Istituzioni di Matematica 2, c.l. triennale in Ottica ed Optometria (6 crediti); affidamento del corso di Analisi 2, c.l. specialistica in Informatica (6 crediti).

a.a. 2012–2013 Congedo per motivi di studio

a.a. 2011–2012 Titolare del corso di Matematica, c.l. triennale in Biologia Generale e Applicata (8 crediti); affidamento del corso di Istituzioni di Matematica 2, c.l. triennale in Ottica ed Optometria (6 crediti); affidamento del corso di Analisi 2, c.l. specialistica in Informatica (6 crediti).

a.a. 2010–2011 Titolare del corso di Matematica, c.l. triennale in Biologia Generale e Applicata (8 crediti); affidamento del corso di Istituzioni di Matematica 2, c.l. triennale in Ottica ed Optometria (6 crediti); affidamento del corso di Analisi 2, c.l. specialistica in Informatica (6 crediti).

a.a. 2009–2010 Titolare del corso di Matematica, c.l. triennale in Biologia Generale e Applicata (8 crediti).

a.a. 2008–2009 Titolare del corso di Matematica, c.l. triennale in Biologia Generale e Applicata (8 crediti).

a.a. 2007–2008 Docente per affidamento del corso di Matematica e Statistica (8 crediti), c.l. triennale in Biologia Generale e Applicata.

a.a. 2006–2007 Collaborazione al corso di Analisi Matematica II, c.l. Matematica (docente: Prof. V. Coti Zelati);

a.a. 2005–2006 Collaborazione al corso di Analisi Matematica I, Mod. A e B, c.l. Matematica (docente: Prof. V. Coti Zelati); partecipazione alle commissioni di esame di Lingua Straniera 1 e 2.

a.a. 2003–2004 Collaborazione al corso di Analisi Matematica I, Mod. A e B, c.l. Matematica (docente: Prof. V. Coti Zelati).

a.a. 2002–2003 Collaborazione al corso di Analisi Matematica II, c.l. Matematica (docente: Prof. V. Coti Zelati).

a.a. 2001–2002 Collaborazione ai corsi di Analisi Matematica II, moduli A e B, c.l. Matematica (docente: Prof. V. Coti Zelati) e di Matematica, c.l. Biologia Generale ed Applicata (docente: Prof. A. Simoncelli).

a.a. 1998–1999 Collaborazione ai corsi di Istituzioni di Analisi Superiore, c.l. Matematica (docente: Prof. A. Cialdea) e Istituzioni di Matematiche I, c.l. Scienze Geologiche (docente: Prof. P. Vitolo).

a.a. 1997–1998 Collaborazione ai corsi di Istituzioni di Analisi Superiore, c.l. Matematica (docente: Prof. A. Cialdea) e Istituzioni di Matematiche I, c.l. Scienze Geologiche (docente: Prof. P. Vitolo).

a.a. 1996–1997 Collaborazione al corso di Istituzioni di Analisi Superiore, c.l. Matematica (docente: Prof. A. Cialdea).

a.a. 1995–1996 Collaborazione al corso di Istituzioni di Matematiche I, c.l. Scienze Geologiche (docente: Prof. P. Vitolo); seminari integrativi per il corso di Biomatematica, c.l. Scienze delle Produzioni Animali (docente: Prof. G. Korchmaros).