ISABELLA IANNI

Curriculum Vitae AI FINI DELLA PUBBLICAZIONE

Roma, November 30th 2018

Part I – General Information

Full Name	Isabella Ianni
Date of Birth	29/01/1982
Place of Birth	Frosinone
Citizenship	Italian
Web-page	https://sites.google.com/site/isabellaiannihomepage
Spoken Languages	Italian (mother tongue), English (fluent), French (intermediate), German (beginner)

Part II – Education

Type	Year	Institution	Notes
PhD in Mathematical Analysis (equivalent to *Dottore di Ricerca in Matematica*)	2009	SISSA, Trieste	Advisor: prof. Antonio Ambrosetti Thesis: *Existence and stability of standing waves for the Schrödinger-Poisson-Slater system*
Master's Degree in Mathematics (*Laurea Specialistica in Matematica*)	2006	Università di Roma *La Sapienza*	Advisor: prof.ssa Filomena Pacella Thesis: *Simmetria di soluzioni di equazioni ellittiche semilineari* Grade: 110/110 summa cum laude
Bachelor's Degree in Mathematics (*Laurea Triennale in Matematica)*	2004	Università di Roma *La Sapienza*	Advisor: prof. Luigi Orsina Thesis: *Il problema di Dirichlet per equazioni ellittiche lineari in* R^N Grade: 110/110 summa cum laude

Part III – Appointments

III.A – Academic Appointments

Start	End	Institution	Position
30/12/2010	------	Università degli Studi della Campania *Luigi Vanvitelli*	**Ricercatore Universitario**
01/10/2009	30/12/2010	*Johann Wolfgang Goethe* Universität, Frankfurt-am-Main (Germany)	**Post-doc** (Wissenschaftlich Mitarbeit)

III.B – Other Appointments

Start	End	Institution	Position
31/10/2018	03/11/2018	University of Sydney (Australia)	Invited visiting professor (*MATRIX Satellite Conference*)
04/11/2018	09/11/2018	MATRIX Centre, Melbourne (Australia)	Invited visiting professor (intensive period *Recent Trends on Nonlinear PDEs of Elliptic and Parabolic Type*)
19/07/2017	22/07/2017	Università di Sassari	Invited visiting professor
15/03/2017	17/03/2017	Università di Sassari	Invited visiting professor
27/02/2017	02/03/2017	Universität Basel (Switzerland)	Invited visiting professor
23/01/2017	27/01/2017	Università di Roma *La Sapienza*	Invited visiting professor (for *Roma Caput PDE*)
25/09/2016	30/09/2016	BIRS-CMO Oaxaca (Mexico)	Invited visiting professor (for *Asymptotic Patterns in Variational Problems: PDE and Geometric Aspects)*
07/09/2016	09/09/2016	SISSA, Trieste	Invited visiting professor (for *Donne e ricerca in Matematica: il contributo della SISSA*)
30/05/2016	01/06/2016	Università di Sassari	Invited visiting professor
26/06/2016	02/07/2016	Institut Mittag-Leffler, Djursholm (Sweden)	Invited visiting professor (for EWM-EMS *Summer School*)

07/09/2015	11/09/2015	ULB Brussels (Belgium)	Invited visiting professor (for *Workshop in Nonlinear PDEs*)
17/06/2015	19/06/2015	Università di Roma *La Sapienza*	Invited visiting professor (for *Espalia*)
07/04/2015	30/04/2015	ETH Zürich (Switzerland)	Invited visiting professor
11/03/2014	22/03/2014	Pontificia Universidad Católica de Chile, Santiago (Chile)	Invited visiting professor
22/05/2013	23/05/2013	Università di Parma	Invited visiting professor
23/04/2913	23/04/2013	Università di Roma *Tor Vergata*	Invited visiting professor
01/03/2013	31/03/2013	Université *Paul Sabatier*, Toulouse (France)	Maître de Conférences invité
26/11/2012	30/11/2012	CIRM Luminy (France)	Invited visiting professor (for the Workshop *Singular limit problems in nonlinear PDEs*)
29/10/2012	01/11/2012	Università di Verona	Invited visiting professor
03/09/2012	10/09/2012	CMAF-Universidade de Lisboa (Portugal)	ERASMUS invited visiting professor
03/01/2012	12/01/2012	TATA Institut – TIFR Centre for Appl. Math., Bangalore (India)	Invited visiting professor (for the *School on Cocompact Imbeddings, Profile Decompositions and their Applications to PDE*)
28/11/2011	04/12/2011	Université *Paul Sabatier*, Toulouse (France)	Invited visiting professor
27/10/2011	27/10/2011	Università di Roma *La Sapienza*	Invited visiting professor
30/03/2010	30/03/2010	Università di Roma *Tor Vergata*	Invited visiting student
11/05/2009	17/05/2009	*Johann Wolfgang Goethe*-Universität, Frankfurt-am-Main (Germany)	Invited visiting student
16/11/2008	19/12/2008	Universidad de Granada (Spain)	Invited visiting student
15/04/2008	22/04/2008	Universidad de Granada (Spain)	Invited visiting student

Part IV – Teaching experience

IV.A – Courses/Lectures

Year	Institution	Lecture/Course
2018	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica 3* (68h, course for the Bachelor's Degree in *Mathematics*)
2018	Università degli Studi della Campania *Luigi Vanvitelli*	*Istituzioni di Matematica* (16h, part of a course for the Bachelor's Degree in *Scienze Ambientali*)
2017	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica 3* (68h, course for the Bachelor's Degree in *Mathematics*)
2017	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica* (24h, part of a course for the Bachelor's Degree in *Scienze e Tecniche dell'Edilizia*)
2016	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica 3* (68h, course for the Bachelor's Degree in *Mathematics*)
2015	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica 3* (68h, course for the Bachelor Degree in *Mathematics*)
2015	Università degli Studi della Campania *Luigi Vanvitelli*	*Istituzioni di Matematiche* (40h, part of a course for the Bachelor's Degree in *Farmacia*)
2014	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica 2* (72h, part of a course for the Bachelor's Degree in *Mathematics*)
2013	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica 3* (64h, course for the Bachelor's Degree in *Mathematics*)
2012	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica 3* (64h, course for the Bachelor's Degree in *Mathematics*)
2012	CMAF - Universidade de Lisboa (Portugal)	*Introduction to the Schrödinger-Maxwell problem* (minicourse of 3 lectures for PhD/Master students)
2011	Università degli Studi della Campania *Luigi Vanvitelli*	*Matematica 2* (48h, course for the Bachelor's Degree in *Scienze Ambientali*)

2011	Università degli Studi della Campania *Luigi Vanvitelli*	*Analisi Matematica 1* (assistant, course for the Bachelor's Degree in *Mathematics)*
2010	*Johann Wolfgang Goethe* Universität, Frankfurt-am-Main (Germany)	*Differential Equations* (assistant)
2010	*Johann Wolfgang Goethe* Universität, Frankfurt-am-Main (Germany)	*Theorie kritischer Punkte für Variationsprobleme* (assistant, course for Master's Degree in Mathematics)
2009	ICTP. Trieste	*Differential Equations* (part of a post-graduate diploma course in *Mathematics*)
2007	ICTP, Trieste	*Ordinary Differential Equations* (assistant, post-graduate diploma course in *Mathematics*)

IV.B – Mentoring as an advisor (at the Università degli Studi della Campania *Luigi Vanvitelli*)

Year	Student	Degree
2018	Roberta Martino	Bachelor's in Mathematics
2018	Domenico Turino	Bachelor's in Mathematics
2017	Antonella Letizia	Bachelor's in Mathematics
2017	Francesco Pagliuca	Bachelor's in Mathematics
2016	Giuseppina Tessitore	Bachelor's in Mathematics
2015	Elena De Angelis	Bachelor's in Mathematics
2015	Rosa Cerullo	Bachelor's in Mathematics

Part V – Academic Duties

Since 2018	member of the Academic Board for the PhD program *in Matematica, Fisica e Applicazioni per l'Ingegneria*	Università degli Studi della Campania *Luigi Vanvitelli*
Since 2016	member of the ERASMUS Committee of the Mathematics and Physics Department	Università degli Studi della Campania *Luigi Vanvitelli*
Since 2013	member of the Research Committee of the Mathematics and Physics Department	Università degli Studi della Campania *Luigi Vanvitelli*

Part VI – Qualifications, Fellowships, Awards, Society memberships

VI.A – Qualifications

Years	Title
March 2017	ASN – Abilitazione Scientifica Nazionale per la II fascia SC 01/A3 Analisi Matematica, Probabilità e Statistica Matematica

VI.B – Fellowships

Years	Title
Nov 2006 - Oct 2009	3-years fellowship for the PhD program in Mathematical Analysis, instituted by SISSA
2012	LLP/ERASMUS professor mobility fellowship, instituted by Università degli Studi della Campania *Luigi Vanvitelli*

VI.C – Awards

Year	Title
2003	Prize for the *best undergraduate students* in Mathematics, awarded by the Department of Mathematics of Università di Roma *La Sapienza*
2004	Prize for *the best graduate students* in Mathematics, awarded by the Department of Mathematics of Università di Roma *La Sapienza*
2005	Prize for the *best students* in Mathematics, awarded by the Department of Mathematics of Università di Roma *La Sapienza*

VI.D – Society Memberships

Year	Group
Since 2007	INDAM - GNAMPA
2015	UMI

Part VII - Funding Information [grants as PI-principal investigator or I-investigator]

Year	Title	Program	Grant value
2018	[PI]	FFABR	3.000€
2017	Existence and qualitative properties of solutions of nonlinear elliptic problems [PI]	INDAM-GNAMPA Project	2.400€
2014	Blow-up phenomena for semilinear parabolic problems [I] [PI: Francesca De Marchis]	INDAM-GNAMPA Project	1.700€
2012	Nonlinear differential problems: existence and qualitative properties of the solutions [I] [PI: Filomena Pacella]	Progetto Ateneo, Università di Roma *La Sapienza*	39.000€
2012	Variational and perturbative aspects of nonlinear differential problems [I] [PI: Susanna Terracini]	PRIN	340.947€
2009	Variational methods and nonlinear PDEs [I] [PI: Andrea Malchiodi]	PRIN	185.933€
2006	Variational methods and nonlinear differential equations [I] [PI: Antonio Ambrosetti]	PRIN	

Part VIII – Research Interests

Keywords	Brief Description
Elliptic PDEs Parabolic PDEs Schrödinger type evolution PDEs Lane-Emden Asymptotic Analysis Morse Index Variational methods Topological methods Perturbative technique	My research concerns the study of existence and qualitative properties of solutions of *Nonlinear Partial Differential Equations*. In particular I am interested in *Nonlinear Elliptic PDEs* (Lane-Emden eqs, Schrödinger-Poisson eqs, Liouville-type eqs) and in *Nonlinear Evolution PDEs* (parabolic eqs, Schrödinger type eqs). For a detailed description of my research activity see **"Part XII – Description of the Research Results"** in this CV

Part IX – Summary of Scientific Achievements

		Data Base
Year of First Publication	2008	Scopus
Total Number of Publications:	20	Scopus
H-index	7	Scopus
Total Number of Citations	243	Scopus
Average Number of Citations per Publication	12,15	Scopus
Total Impact Factor*	23,44	JCR
Average Impact Factor per Publication	1,172	JCR+Scopus

* Sum of all the Impact Factors corresponding to each publication, each one computed with respect to the year of publication (for the publications of the year 2018, since the IF is not yet available, we have used the 2017 IF)

Product type	Number	Period
Papers published in international journals	20	since 2008 to 2018
Preprints available online	2	2017 and 2018
Lecture notes	1	2019

Part X– Top 5 Impact Publications

Publication	N. of citations	Database
I. Ianni and G. Vaira, *On concentration of positive bound states for the Schrödinger-Poisson problem with potentials*, Adv. Nonlinear Studies 8 (2008) 573-595.	78	Scopus
I. Ianni, *Solutions of the Schrödinger-Poisson problem concentrating on spheres, part II: existence,* M3AS 19 (6) (2009) 877-910.	33	Scopus
I. Ianni and G. Vaira, *Solutions of the Schrödinger-Poisson problem concentrating on spheres, part I: necessary conditions,* M3AS 19 (5) (2009) 707-720.	32	Scopus
I. Ianni, *Sign changing radial solutions for the Schrödinger-Poisson-Slater problem,* Topological Methods in Nonlinear Analysis 41 (2) (2013) 365-385.	27	WOS
I. Ianni and D. Ruiz, *Ground and bound states for a static Schrödinger-Poisson-Slater problem,* Communications in Contemporary Mathematics 14 (1) (2012).	26	Scopus

Part XI– Complete list of Publications, Preprints, Papers in preparation

XI.A – In preparation

[D1] I. Ianni,
Radial solutions of planar Dirichlet and Neumann problems: sharp asymptotic behavior,
in preparation

XI.B – Preprints

[P1] F. De Marchis, M. Grossi, I. Ianni and F. Pacella,
Morse index and uniqueness of positive solutions of the Lane-Emden problem in planar domains,
preprint arXiv:1804.03499.

[P2] F. Gladiali and I. Ianni,
Quasi-radial nodal solutions for the Lane-Emden problem in the ball,
preprint arXiv:1709.03315.

XI.C – Publications

[21] F. De Marchis, I. Ianni and F. Pacella,
Asymptotic analysis of the Lane-Emden problem in dimension two,
contribution in the volume *Partial Differential Equations arising from Physics and Geometry*,
London Mathematical Society Lecture Note Series (No. 450), Cambridge University Press (2019)
(ISBN: 9781108431637)

[20] T. D'Aprile, F. De Marchis and I. Ianni,
Prescribed Gauss curvature problem on singular surfaces,
Calc. Var. PDE 57 (2018).
(doi: 10.1007/s00526-018-1373-3)
[Impact Factor 2017: 1,741 (Impact Factor 2018 not yet available) (JCR); 0 citations (Scopus)]

[19] F. De Marchis, M. Grossi, I. Ianni and F. Pacella,
L∞-norm and energy quantization for the planar Lane-Emden problem with large exponent,
Archiv der Mathematik 111 (4) (2018) 421--429.
(doi: 10.1007/s00013-018-1191-z)
[Impact Factor 2017: 0,590 (Impact Factor 2018 not yet available) (JCR); 1 citation (Scopus)]

[18] F. De Marchis, I. Ianni and F. Pacella,
A Morse index formula for radial solutions of Lane-Emden problems,
Advances in Mathematics, 322 (2017) 682--737.
(doi: 10.1016/j.aim.2017.10.026)
[Impact Factor 2017: 1,372 (JCR); 0 citations (Scopus)]

[17] I. Ianni, S. Le Coz and J. Royer,
On the Cauchy problem and the black solitons of a singularly perturbed Gross-Pitaevskii equation,
SIAM Journal on Mathematical Analysis 49 (2) (2017) 1060--1099.
(doi: 10.1137/15M1029606)
[Impact Factor 2017: 1,528 (JCR); 1 citation (Scopus)]

[16] F. De Marchis, I. Ianni and F. Pacella,
Asymptotic profile of positive solutions of Lane-Emden problems in dimension two,
Journal of Fixed Point Theory and Applications 19 (1) (2017) 889--916.
(doi: 10.1007/s11784-016-0386-9)
[Impact Factor 2017: 0,971 (JCR); 2 citations (Scopus)]

[15] F. De Marchis, I. Ianni and F. Pacella,
Exact Morse index computation for nodal radial solutions of Lane-Emden problems,
Math. Annalen 367 (1) (2017) 185--227.
(doi: 10.1007/s00208-016-1381-6)
[Impact Factor 2017: 1,231 (JCR); 2 citations (Scopus)]

[14] F. De Marchis, I. Ianni and F. Pacella,
Morse index and sign-changing bubble towers for Lane-Emden problems,
AMPA 195 (2) (2016) 357--369.
(doi: 10.1007/s10231-014-0467-6)
[Impact Factor 2016: 0,864 (JCR); 3 citations (Scopus)]

[13] I. Ianni, M. Musso and A. Pistoia,
Blow-up for sign-changing solutions of the critical heat equation in domains with a small hole,
Comm. in Cont. Math. 18 (1) (2016).
(doi: 10.1142/S0219199715500170)
[Impact Factor 2016: 1,191 (JCR); 1 citation (Scopus)]

[12] I. Ianni and G. Vaira,
Non-radial sign-changing solution for the Schrödinger-Poisson problem in the semiclassical limit,
NoDEA 22 (4) (2015) 741--776.
(doi: 10.1007/s00030-014-0303-0)
[Impact Factor 2015: 0,797 (JCR); 8 citations (WOS)]

[11] F. De Marchis, I. Ianni and F. Pacella,
Asymptotic analysis and sign changing bubble towers for Lane-Emden problems,
Journal of the Eur. Math. Soc. 17 (8) (2015) 2037--2068.
(doi: 10.4171/JEMS/549)
[Impact Factor 2015: 1,950 (JCR); 8 citations (Scopus)]

[10] F. De Marchis and I. Ianni,
Blow up of solutions of semilinear heat equations in non-radially symmetric domains of R^2,
Discr. and Cont. Dyn. Syst. - A 35 (3) (2015) 891--907.
(doi: 10.3934/dcds.2015.35.891)
[Impact Factor 2015: 1,127 (JCR); 5 citations (Scopus)]

[9] I. Ianni and S. Le Coz,
Multi-speeds solitary wave solutions for nonlinear Schrödinger systems,
J. London Math. Soc. 89 (2) (2014) 623--639.
(doi: 10.1112/jlms/jdt083)
[Impact Factor 2014: 0,820 (JCR); 8 citations (WOS)]

[8] I. Ianni,
Sign changing radial solutions for the Schrödinger-Poisson-Slater problem,
Topological Methods in Nonlinear Analysis 41 (2) (2013) 365--385.
(ISSN: 1230-3429)
[Impact Factor 2013: 1,075 (JCR); 27 citations (WOS)]

[7] F. De Marchis, I. Ianni and F. Pacella,
Sign changing solutions of Lane Emden problems with interior nodal line and semilinear heat equations,
Journal of Diff. Equations 254 (2013) 3596--3614.
(doi: 10.1016/j.jde.2013.01.037)
[Impact Factor 2013: 1,570 (JCR); 6 citations (Scopus)]

[6] I. Ianni,
Local and global solutions for some parabolic nonlocal problem,
Nonlinear Analysis - Theory Methods and Applications 75 (2012) 4904--4913.
(doi: 10.1016/j.na.2012.04.005)
[Impact Factor 2012: 1,640 (JCR); 3 citations (Scopus)]

[5] I. Ianni and D. Ruiz,
Ground and bound states for a static Schrödinger-Poisson-Slater problem,
Communications in Contemporary Mathematics 14 (1) (2012).
(doi: 10.1142/S0219199712500034)
[Impact Factor 2012: 0,753 (JCR); 26 citations (Scopus)]

[4] I. Ianni and S. Le Coz,
Orbital stability of standing waves of semiclassical nonlinear Schrödinger-Poisson equation,
Adv. In Differential Equations 14 (7-8) (2009) 717--748.
[Impact Factor 2009: 0,892 (JCR); 2 citations (Scopus)]

[3] I. Ianni,
Solutions of the Schrödinger-Poisson problem concentrating on spheres, part II: existence,
M3AS 19 (6) (2009) 877--910.
(doi: 10.1142/S0218202509003656)
[Impact Factor 2009: 1,383 (JCR); 33 citations (Scopus)]

[2] I. Ianni and G. Vaira,
Solutions of the Schrödinger-Poisson problem concentrating on spheres, part I: necessary conditions,
M3AS 19 (5) (2009) 707--720.
(doi: 10.1142/S0218202509003589)
[Impact Factor 2009: 1,383 (JCR); 32 citations (Scopus)]

[1] I. Ianni and G. Vaira,
On concentration of positive bound states for the Schrödinger-Poisson problem with potentials,
Adv. Nonlinear Studies 8 (2008) 573--595.
(doi: 10.1515/ans-2008-0305)
[Impact Factor 2008: 0,562 (JCR); 78 citations (Scopus)]

Part XII – Description of the research results

Lane-Emden equation (in [D1,P1,P2,21,19,18,16,15,14,11,7]):

In a series of recent papers we have studied existence, qualitative properties and uniqueness results for the Lane-Emden equation in smooth bounded domains of R^N with Dirichlet boundary conditions. The Lane-Emden equation is an extremely simple looking semilinear elliptic equation with a power focusing nonlinearity, nevertheless it has a very rich structure in terms of the dependence of the solutions on the exponent *p* of the power nonlinearity and on both the geometry and the topology of the domain. Many open problems are still unsolved and we have addressed some of them, focusing on the superlinear and subcritical case (i.e. when the exponent $p\epsilon(1,p_S)$, where $p_S=+\infty$ in dimension *2*, $p_S:= (N+2)/(N-2)$ in dimension N≥3).

In [P1] we have proved the uniqueness of the positive solution of the Lane-Emden problem in any convex planar domain, when *p* is sufficiently large. This is the first general answer to a longstanding open problem which goes back to the famous work [Gidas, Ni, Nirenberg, CMP 1979] (which contains the proof in the case when the domain is a ball) and it was conjectured to be true already in [Kawhol, Lect. Notes in Math. 1985] and [Dancer, JDE 1988]. Only partial results where know before: some considering specific domains (balls, perturbations of the ball, domains with some additional symmetry, etc) and other considering specific families of solutions (for instance least energy ones). Our proof is based on the study of the nondegeneracy of the solutions and ultimately on the computation of their Morse index for *p* large enough. This computation strongly relies on the characterization of the asymptotic behaviour, as *p* goes to +∞, of any family of positive solution.

While in dimension N≥3 the behaviour of the solutions as p converges to p_S was known (see [Struwe, Math.Z. 1984], [Schoen, Lect. Notes 1988-1989], [Han, Ann. Inst. H. Poincare, 1991]), in dimension *2* this was still an open problem and only the specific case of families of least energy solutions had been previously described. In [16] (see also [19,21]) we have given a complete characterization of the asymptotic behaviour of the positive solutions as *p* goes to +∞ in any smooth bounded planar domain. In simple words we have proven concentration at a finite number of distinct points of the domain for any (bounded energy) solution, moreover differently than in the higher dimensional case the solution does not blow-up but remains bounded (i.e. the solution is a "*k*-peaks solution"). The concentration points may be located in term of a system which involves Green and Robin functions of -Δ in the domain. We have also described the pointwise behaviour of the solutions out of the concentration set and identified a "limit profile" around each concentration point, which is simple. Moreover, we have shown that the energy is quantized in the limit as *p* goes to +∞. The exact value of the quantization constants as well as the one of the L^∞-norm has been then obtained in [19].
In [11,D1] we have pushed the asymptotic analysis also to treat the case of sign-changing solutions (for which little is known also in higher dimension). In [11], in dimension *N=2* we have obtained some general partial result: again, boundedness of the solution and concentration at a finite number of distinct points, but now the concentration points may be not simple as already shown in [Grossi, Grumiau, Pacella, J. Math. Pures Appl. 2014] for the radial case, hence a complete general characterization seems to be a very hard task to be carried out.

In [D1] we can give a sharp description of the asymptotic behaviour, as p goes to $+\infty$, of all the (sign-changing) radial solutions in the unit ball, both for the Neumann and the Dirichlet problems in the ball and for the equation in the whole plane. In [11] we have been able to characterize the asymptotic behaviour as p goes to $+\infty$ of certain symmetric least energy sign-changing solutions in domains which are invariant by suitable finite group of rotations of the plane around the origin. We had previously investigated some qualitative properties of these symmetric least energy solutions in [7] where in particular a uniform energy bound was already obtained by exploiting the associated parabolic flow, with a suitable choice of the initial condition, combined with a topological argument based on the Krasnoselskii genus. From the energy estimate in [7] we were then able to deduce a first control on the number of nodal regions of the solution and also, using some geometrical arguments, on the shape of its nodal line. In [11] we have then focused on the study of the asymptotic behaviour of these solutions, proving a surprising property: the origin is a non-simple concentration point, and asymptotically the solutions look as the superposition of two different profiles (at different scales), a solution of the regular Liouville equation and a solution of a singular Liouville equation. The phenomenon is absolutely new for non-radially symmetric domains and needs to take into account the behaviour of the nodal lines, which are proven to be a closed curve around the origin which shrinks to it. In [14], again in a symmetric setting and for sign-changing solutions, we have then highlighted a connection between the existence of Morse index uniform a priori bounds for the solutions and this type of asymptotic behaviour.

Computing the Morse index of a solution or having at least a uniform bound of it is, in general, not an easy issue, we have addressed this topic in [P1,18,15].
In [P1], as already mentioned, we have considered the case of positive solutions in dimension *2* (actually for our purpose it was enough there to compute the Morse index only for families of *1*-peak solutions, while the case of *k*-peaks solutions is still open).
[15,18] concern with the computation of the Morse index of sign-changing radial solutions. In [18] we have first obtained a lower bound for the Morse index of any radial solution either in a ball or in an annulus, for any dimension $N\geq 2$ and any exponent $p \in (1, p_S)$. The bound is given by the number $m+ N(m-1)$, where m is the number of nodal regions of the solution and N is the dimension. In dimension $N\geq 3$ we have then shown that this lower bound is optimal, indeed we have proved that for p sufficiently close to p_S, the Morse index of the solution is exactly $m+ N(m-1)$. This formula shows an unexpected phenomenon, since it says that the number of all the negative eigenvalues of the linearized operator, which is a Schrödinger type operator, grows linearly in m, which is also the number of the radial negative eigenvalues. We stress that we obtain the formula for p close to the critical exponent p_S, this is due to the proof which relies strongly, among other things, on the analysis of the asymptotic behaviour of the radial solutions as p goes to p_S. Anyway, the result is optimal since we can also prove that as p varies from *1* to p_S also the Morse index varies and in particular for p close to *1* it is indeed much higher. In dimension *2* the formula does not hold. Indeed, in this case $p_S = +\infty$ and in [15] we have explicitly computed the Morse index for p large, showing that it is higher than the value given by the formula. This is due ultimately to the different asymptotic behaviour of the solutions when the dimension is *2*. We suspect that the lower bound obtained in [18] is then not optimal when the dimension is *2*.

Finally, in [P2] we have exploited the information given by the Morse index computations done in [15] to prove the existence of at least *3* new (sign-changing, non-radial) solutions in the planar ball.
Each of these solutions bifurcates from the branch of the radial least energy sign-changing solutions at a certain value of the exponent p and it is invariant by a certain finite group of

rotations around the origin. Moreover, it has a "quasi-radial" shape, in the sense that it has exactly *2* nodal regions and its nodal line does not intersect the boundary of the ball. We conjecture that these non-radial bifurcating solutions actually coincide with the symmetric least energy sign-changing solutions (with the same symmetry). Indeed in [P2] we have been able to prove that the symmetric least energy sign-changing solutions are radial for *p* close to *1* and non-radial for *p* sufficiently large. The proof exploits again the information given by the exact computation of the Morse index and relies on a spectral decomposition which allows to detect the symmetries of the eigenfunctions. We also need to perform a delicate blow-up analysis of the symmetric solutions.

Schrödinger-Poisson equation (in [1,2,3,4,5,8,12]):

The Schrödinger-Poisson equation is a semilinear equation in R^N with a focusing power nonlinearity and a defocusing Hartree nonlocal nonlinearity. It is derived after the reduction of a system having a nonlinear stationary Schrödinger equation coupled with a Poisson equation.
Non-existence results and existence of positive solutions where known in the literature, depending on the exponent *p* of the power nonlinearity, while there were no existence results concerning sign-changing solutions.

In [8] we have shown the existence of sign-changing solutions in dimension *N=3*, for any *p∈ [3,5).* More precisely we have proven the existence of a radially symmetric sign-changing solution with *k* zeros, for any *k∈N*. Due to the presence of the nonlocal term one cannot simply apply the well-known Nehari's method of gluing positive and negative solutions on alternating annulii, since the solution on each annulus would need global information. Hence, we follow a different approach: we approximate the problem in the whole R^N with Dirichlet problems in balls, solve them by combining dynamical and topological arguments, then we show that we can pass to the limit keeping the number of zeros. In each ball the solution of the elliptic problem is found by looking for equilibria in the omega-limit set of trajectories of the associated parabolic problem. In order to get equilibria, we take initial data on the boundary of the domain of attraction of zero, which is an asymptotically stable equilibrium and, in order to obtain equilibria with a fixed number of zeros, we selected special initial data. The selection is possible due to a topological argument based on the use of the Krasnoselskii genus (the nonlinearities are odd) and to the zero-number property for the parabolic flow.

In [12] we have proven the existence of infinitely many non-radial sign-changing solutions for the singularly perturbed Schrödinger-Poisson problem in R^N, via a Lyapunov-Schmidt reduction method in a variational framework. These solutions look like superposition of signed "peaks", displaced in suitable symmetric configurations, which collapse at the same points in the semiclassical limit (cluster solutions).

In [5] we have considered a static version of the Schrödinger-Poisson problem, motivated by previous results in the literature, and proved existence of ground and bound states by using variational methods.

[1,2,3] are concerned with the study of a singularly perturbed Schrödinger-Poisson problem in presence of exterior potentials, using a perturbative method in a variational framework. We prove existence of solutions concentrating at a point ([1]) and also existence of solutions concentrating at spheres ([3]). In [2] we deduce necessary conditions for concentration on spheres.

Prescribed Gauss curvature problems (in [20]):

In [20] we considered the problem of the existence of conformal metrics of prescribed Gaussian curvature on a closed surface Σ admitting conical singularities of orders α_k's at points p_k's.
Most of the existing literature is about the case of positive prescribed Gaussian curvature and very few results were available for the sign-changing case. We mainly focused on the case when the prescribed Gaussian curvature is sign-changing and provided existence results when the quantity $\chi(\Sigma)+\sum_k\alpha_k$ approaches positive even integers, where $\chi(\Sigma)$ is the Euler characteristic of the surface Σ. This geometrical problem reduces to solve a singular Liouville equation on the surface Σ, our proof employs a min-max scheme jointly with a finite dimensional reduction method applied to this equation.

Nonlinear parabolic equations (in [6,7,8,10,13]):

As already mentioned, in [7,8] we used the parabolic flow mainly as a tool in order to deduce information on the qualitative properties for the solutions of the associated elliptic problem (stationary solutions).
In [7], as a by-product of our main results, we also get the existence of a global radial sign-changing solution for the parabolic Schrödinger-Poisson problem having *k* zeros at any time, for any $k\epsilon N$.

[10,13] are instead concerned with the study of the blow-up for a nonlinear parabolic Lane-Emden equation. More precisely in [10] we have considered the *2*-dimensional case and give sufficient conditions for a family of sign-changing stationary solutions *v* under which the solution of the parabolic problem with initial value λv blows up in finite time if $|\lambda-1|>0$ is sufficiently small and *p* large (for a positive initial condition instead this is never the case). We have also shown that the symmetric solutions of the Lane-Emden problem studied in [7,11] satisfy these sufficient conditions when *p* is sufficiently large. Observe that since for $\lambda=1$ the solution is global, this result implies that, the set of the initial conditions for which the solution is global is in general not star-shaped with respect to the origin.

In [13] we have proven a similar result for the critical parabolic Lane-Emden equation in smooth bounded domains of R^N, $N\geq 3$ having a small hole. In this case the blow-up may be in finite or infinite time. We have then shown that the set of the initial conditions for which the solution is global and bounded is not star-shaped.

In [6] we have studied local and global existence of solutions for some semilinear parabolic initial boundary value problems with autonomous nonlinearities having a nonlocal "Newtonian" term. Some of the results obtained have been used in the proof of the existence results for the elliptic Schrödinger-Poisson problem obtained in [8].

Nonlinear Schrödinger type evolution equations (in [17,9,4]):

In [17] we have considered the one-dimensional Gross-Pitaevskii equation perturbed by a Dirac potential and with non-standard boundary conditions. Using a fine analysis of the properties of the linear propagator, we have studied the well-posedness of the Cauchy Problem for the nonlinear equation in an energy space of functions with modulus *1* at infinity. The main issues were the fact that the energy space is not a vector space and the loss of regularity of the solutions

due to the Dirac perturbation. Then we have shown the persistence of the stationary black soliton of the unperturbed problem as a solution. We have also proven the existence of another branch of non-trivial stationary waves. Depending on the attractive or repulsive nature of the Dirac perturbation and of the type of stationary solutions, we have proven orbital
stability via a variational approach, or linear instability via a bifurcation argument.

In [9] we have proven the existence of a new type of solutions to a nonlinear Schrödinger system. These
solutions, which we have called multi-speeds solitary waves, behave at large time as a couple of scalar solitary waves traveling at different speeds. The proof relies on the construction of approximations of the multi-speeds solitary waves by solving the system backwards in time and using energy methods to obtain uniform estimates.

In [4] we have studied the orbital stability of the single-spike semiclassical standing waves of a nonlinear Schrödinger-Poisson equation with space-dependent potentials, whose existence was proved in [1]. When the nonlinearity is subcritical or supercritical, we have proven that the nonlocal Poisson-term does not influence the stability of standing waves, whereas in the critical case it may create instability if its value at the concentration point of the spike is too large. The proofs are based on the study of the spectral properties of a linearized operator and on the analysis of a slope condition. Our main tools were perturbation methods and asymptotic expansion formulas.

Part XIII– Talks and seminars

XIII.A – Invited talks and seminars

Date	Place and event
September 2019	Alghero (Italy) *Nonlinear Days in Alghero*
May 2019	Gaeta (Italy) *International Conference on Elliptic and Parabolic Problems* Session: *Variational Problems and Nonlinear PDEs* Session: *Semilinear and Quasilinear PDEs*
February 2019	RISM Varese (Italy) RISM workshop on *Advances and Challenges in Nonlinear Elliptic System*
November 2018	MATRIX Center-Melbourne (Australia) *Recent Trends on Nonlinear PDEs of Elliptic and Parabolic Type*
November 2018	University of Sydney, Sydney (Australia) *MATRIX Satellite Conference*
July 2018	Rauischholzhausen Castle, Ebsdorfergrund (Germany) *Variational Problems arising from Physics and Geometry*
July 2018	Taipei (Taiwan) *12th AIMS Conference on Dynamical Systems, Differential Equations and Applications* Session: *Qualitative properties of solutions to local and nonlocal problems* Session: *Modern topics in nonlinear PDEs and applications*
February 2018	Scuola Normale Superiore, Pisa (Italy) *Variational Methods in Analysis, Geometry and Physics*
June 2017	Bedlewo (Poland) Workshop *Emerging issues in nonlinear elliptic equations: singularities, singular perturbations and non local problems*
May 2017	Gaeta (Italy) *International Conference on Elliptic and Parabolic Problems* Session: *Nonlinear PDE's and Functional Inequalities*
March 2017	Universität Basel (Switzerland) Research Seminar
January 2017	Università di Roma *La Sapienza* (Italy) Workshop *Roma Caput PDE*
September 2016	Oaxaca (Mexico) BIRS-CMO Workshop *Asymptotic Patterns in Variational Problems: PDE and Geometric Aspects*
September 2016	SISSA, Trieste (Italy) Workshop *Donne e ricerca in Matematica: il contributo della SISSA*

June 2016	Cogne (Italy) Workshop *Pde's at the Grand Paradis. International conference on Variational Methods and Nonlinear PDE's. On the occasion of Filomena Pacella's 60th birthday*
May 2016	Gaeta (Italy) *9th European Conference on Elliptic and Parabolic Problems* Session: *Some aspects of nonlinear elliptic equations* Session: *Variational models and transportation problems*
November 2015	Università degli Studi di Napoli *Parthenope*, Napoli (Italy) *2nd Conference on Recent Trends in Nonlinear Phenomena*
September 2015	Siena (Italy) *XX Congresso UMI* Session: *Analisi Nonlineare e Sistemi Hamiltoniani*
September 2015	ULB Brussels (Belgium) *Workshop in Nonlinear PDEs*
June 2015	Università di Roma *La Sapienza* (Italy) Workshop *Espalia. Three days in PDEs and calculus of variations between Italy and Spain*
April 2015	ETH Zürich (Switzerland) Research Seminar
March 2015	Punta Arenas (Chile) *International conference on Nonlinear elliptic PDEs at the End of the World*
December 2014	Venezia (Italy) *Workshop in honor of Antonio Ambrosetti on the occasion of his 70th birthday*
July 2014	Madrid (Spain) *The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications* Session*: Recent trends in nonlinear Schrodinger systems*
September 2013	Sao Paulo (Brazil) *International Workshop on Variational Problems and PDE's*
May 2013	Dipartimento di Matematica, Università di Parma (Italy) Research Seminar
April 2013	Dipartimento di Matematica, Università di Tor Vergata, Roma (Italy) Research Seminar
November 2012	CIRM Luminy (France) Workshop *Singular limit problems in nonlinear PDEs*
September 2012	CMAF - Universidade de Lisboa (Portugal) Research Seminar
January 2012	TATA Institute – TIFR Centre for Applicable Mathematics, Bangalore (India) School on *Cocompact Imbeddings, Profile Decompositions and their Applications to PDE*

November 2011	Institut de Mathématiques - Université *Paul Sabatier* Toulouse (France) Research Seminar
October 2011	Dipartimento di Matematica, Università La Sapienza, Roma (Italy) Research Seminar
January 2011	Venezia (Italy) Joint meeting of the research projects *Variational and perturbative methods for nonlinear differential equations*
March 2010	Dipartimento di Matematica, Università di Tor Vergata, Roma (Italy) Research Seminar
May 2009	Institut für Mathematik, *Johann Wolfgang Goethe*-Universität, Frankfurt-am-Main (Germany) Research Seminar
December 2008	Departamento de Análisis Matemático, Universidad de Granada (Spain) Research Seminar
April 2008	Departamento de Análisis Matemático, Universidad de Granada (Spain) Research Seminar

XIII.B – Other talks and seminars

Date	Place and event
January 2014	CMAF - Universidade de Lisboa, Lisbon (Portugal) Workshop *Variational Methods in Elliptic Equations and Systems, dedicated to the memory of Miguel Ramos*
May 2012	Perugia (Italy) Workshop on *Nonlinear Partial Differential Equations on the occasion of the sixtieth birthday of Patrizia Pucci*
May 2008	SISSA, Trieste (Italy) Research Seminar

XIII.C – Poster presentation

Date	Place and event
June 2016	Institut Mittag-Leffler, Djursholm (Sweden) EWM-EMS Summer School on *Geometric and Physical aspects of Trudinger-Moser type inequalities*

Part XIV – Scientific Events Organized

September 2018	Caserta (Italy) Workshop *Nonlinear Analysis and PDEs*
July 2018	Taipei (Taiwan) *12th AIMS Conference on Dynamical Systems, Differential Equations and Applications* Session: *Recent trends in nonlinear PDEs*
September 2016	Cagliari (Italy) workshop *Geometric properties of solutions to elliptic and parabolic problems*
February 2015	Granada (Spain) Congreso de la RSME. Session: *Nonlinear Analysis and Elliptic PDEs*

Part XV – Referee Activity

Referee for the following Journals

Archiv der Mathematik
Annali di Matematica Pura ed Applicata
Bulletin of the London Math. Society
Calc. Var. PDE
Communications in Contemporary Mathematics
Discrete and Continuous Dynamical Systems
ESAIM: Control, Optimisation and Calculus of Variations
Journal of Dynamics and Differential Equations
Journal of Differential Equations
Journal of Mathematical Analysis and Applications
Journal of Mathematical Physics
Mathematische Zeitschrift
Mediterranean Journal of Mathematics
Nonlinear Analysis Theory Methods and Applications
Nonlinear Analysis Series B: Real World Applications
Taiwanese Journal of Mathematics
Zeitschrift für Angewandte Mathematik und Physik

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Part XVI – Selected Publications for the evaluation

[max 12 publications, in the 5 years' timeframe *from January 1st, 2013 to December 31st, 2017* (see art. 1, D.R. n. 2449/2018 del 16.10.2018)]

1. *A Morse index formula for radial solutions of Lane-Emden problems,*
   F. De Marchis, I. Ianni and F. Pacella,
   Advances in Mathematics, 322 (2017) 682--737.
   ISSN: 0001-8708
   DOI: 10.1016/j.aim.2017.10.026
   Impact Factor 2017: 1,372 (JCR)
   Citations: 0 (Scopus)

2. *On the Cauchy problem and the black solitons of a singularly perturbed Gross-Pitaevskii equation*,
   I. Ianni, S. Le Coz and J. Royer,
   SIAM Journal on Mathematical Analysis 49 (2) (2017) 1060--1099.
   ISSN: 0036-1410
   DOI: 10.1137/15M1029606
   Impact Factor 2017: 1,528 (JCR)
   Citations: 1 (Scopus)

3. *Asymptotic profile of positive solutions of Lane-Emden problems in dimension two,*
   F. De Marchis, I. Ianni and F. Pacella,
   Journal of Fixed Point Theory and Applications 19 (1) (2017) 889--916.
   ISSN: 1661-7738
   DOI: 10.1007/s11784-016-0386-9
   Impact Factor 2017: 0,971 (JCR)
   Citations: 2 (Scopus)

4. *Exact Morse index computation for nodal radial solutions of Lane-Emden problems*,
   F. De Marchis, I. Ianni and F. Pacella,
   Mathematische Annalen 367 (1) (2017) 185--227.
   ISSN: 0025-5831
   DOI: 10.1007/s00208-016-1381-6
   Impact Factor 2017: 1,231 (JCR)
   Citations: 2 (Scopus)

5. *Morse index and sign-changing bubble towers for Lane-Emden problems*,
   F. De Marchis, I. Ianni and F. Pacella,
   Annali di Matematica Pura ed Applicata 195 (2) (2016) 357--369.
   ISSN: 0373-3114
   DOI: 10.1007/s10231-014-0467-6
   Impact Factor 2016: 0,864 (JCR)
   Citations: 3 (Scopus)

6. *Blow-up for sign-changing solutions of the critical heat equation in domains with a small hole,*
I. Ianni, M. Musso and A. Pistoia,
Communications in Contemporary Mathematics 18 (1) (2016).
ISSN: 0219-1997
DOI: 10.1142/S0219199715500170
Impact Factor 2016: 1,191 (JCR)
Citations: 1 (Scopus)

7. *Non-radial sign-changing solution for the Schrödinger-Poisson problem in the semiclassical limit*,
I. Ianni and G. Vaira,
Nonlinear Differential Equations and Applications NoDEA 22 (4) (2015) 741--776.
ISSN: 1021-9722
DOI: 10.1007/s00030-014-0303-0
Impact Factor 2015: 0,797 (JCR)
Citations: 8 (WOS)

8. *Asymptotic analysis and sign changing bubble towers for Lane-Emden problems,*
F. De Marchis, I. Ianni and F. Pacella,
Journal of the European Mathematical Society 17 (8) (2015) 2037--2068.
DOI: 10.4171/JEMS/549
Impact Factor 2015: 1,950 (JCR)
Citations: 8 (Scopus)

9. *Blow up of solutions of semilinear heat equations in non-radially symmetric domains of R^2*,
F. De Marchis and I. Ianni,
Discrete and Continuous Dynamical Systems - Series A 35 (3) (2015) 891--907.
ISSN: 1078-0947
DOI: 10.3934/dcds.2015.35.891
Impact Factor 2015: 1,127 (JCR)
Citations: 5 (Scopus)

10. *Multi-speeds solitary wave solutions for nonlinear Schrödinger systems*,
I. Ianni and S. Le Coz,
Journal of the London Mathematical Society 89 (2) (2014) 623--639.
ISSN: 0024-6107
DOI: 10.1112/jlms/jdt083
Impact Factor 2014: 0,820 (JCR)
Citations: 8 (WOS)

11. *Sign changing radial solutions for the Schrödinger-Poisson-Slater problem,*
I. Ianni,
Topological Methods in Nonlinear Analysis 41 (2) (2013) 365--385.
ISSN: 1230-3429
Impact Factor 2013: 1,075 (JCR)
Citations: 27 (WOS)

12. *Sign changing solutions of Lane Emden problems with interior nodal line and semilinear heat equations,*
F. De Marchis, I. Ianni and F. Pacella,
Journal of Differential Equations 254 (2013) 3596--3614.
ISSN: 0022-0396
DOI: 10.1016/j.jde.2013.01.037
Impact Factor 2013: 1,570 (JCR)
Citations: 6 (Scopus)

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Part XVII – Selected Titles for the evaluation

1) Copia del certificato del titolo di *Doctor Philosophiae in Mathematical Analysis* conseguito presso la SISSA di Trieste in data 23/10/2009;
   (Ai sensi dell'art.18, comma 3, dello Statuto della SISSA pubblicato sulla G.U. n.62 del 15.03.2001, il predetto attestato è equipollente al titolo di *Dottore di Ricerca in Matematica);*

2) Copia del contratto di post-doc (*Wissenschaftlich Mitarbeit)* della durata di due anni, a decorrere dal 01/10/2009, presso la *Johann Wolfgang Goethe* Universität, Frankfurt-am-Main (Germania) e integrazione col documento di cessazione anticipata di tale rapporto lavorativo;

3) Copia del Decreto Rettoriale n. 2943 del 29 Dicembre 2010 di Nomina a Ricercatore Universitario presso la Seconda Università degli Studi di Napoli (l'attuale Università degli Studi della Campania *Luigi Vanvitelli*), a decorrere dal 30 Dicembre 2010;

4) Copia del contratto di professore invitato (*Maitre de conférences invité*) per un mese sul periodo dal 1 Gennaio 2013 al 31 Agosto 2013, presso la Université *Paul Sabatier* di Toulouse (Francia);

5) Copia dell'Attestato di Docenza relativo al minicorso di 3 lezioni tenuto al CMAF - University of Lisbon (Portogallo) nel periodo 3—10 Settembre 2012;

6) Copia della lettera di assegnazione del progetto di ricerca INDAM-GNAMPA 2017 - *Esistenza e proprietà qualitative di soluzioni per problemi ellittici nonlineari*;

7) Copia della lettera di presentazione da parte della Prof.ssa Monica Musso, Professore di Matematica presso il Department of Mathematical Sciences della University of Bath (Regno Unito);

8) Copia della lettera di presentazione da parte della Prof.ssa Filomena Pacella, Professore Ordinario di Analisi Matematica presso il Dipartimento di Matematica dell'Università di Roma *La Sapienza*;

9) Copia della lettera di presentazione da parte del Prof. Tobias Weth, Professore di Analisi Matematica presso la *Johann Wolfgang Goethe* Universität di Frankfurt-am-Main (Germania);

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