Andrea Tellini

Curriculum Vitae

Departamento de Matemática Aplicada
a la Ingeniería Industrial
Universidad Politécnica de Madrid
E.T.S. Ingeniería y Diseño Industrial
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Personal information

Place and date of birth

Udine (Italy), 9th January 1986

Citizenship

Italian

Present Position

Sept 2018– Assistant Professor at Polithecnic University of Madrid

Past Positions

Feb 2017–Aug 2018 Post-doc researcher (Juan de la Cierva incorporación program) at Department of Mathematics (Universidad Autónoma de Madrid), Tutor: Prof. Carlos Mora Corral

Oct 2014–Jan 2017 Post-doc researcher at Centre d'Analyse et de Mathématique Sociales, École des Hautes Études en Sciences Sociales, Paris, Responsible: Prof. Henri Berestycki

Oct 2010–Sept 2014 Trainee researcher at Universidad Complutense de Madrid (Spain)

Habilitations

June 2017 Acreditaciones ANECA (Spain) *Profesor Contratado Doctor* and *Profesor Universidad Privada*

Feb 2015 Qualification of the *Conseil National des Universités* (France) for *Maître de conférences*

Oct 2014 Acreditación ANECA (Spain) *Profesor Ayudante Doctor*

Education

2011–2013 **Ph.D. in Mathematics**, *Universidad Complutense de Madrid*, Madrid.
Passed *cum laude* and European Doctorate Mention
Supervisors: J. López-Gómez, M. Molina-Meyer

2010–2011 **Master in Mathematical Research**, *Universidad Complutense de Madrid*, Madrid.
Mark of the final dissertation: 10/10 *cum laude*

2005–2010 **Diploma *Scuola Superiore***, *Scuola Superiore dell'Università degli Studi di Udine*, Udine.
Mark: 110/110 *cum laude*

2008–2010 **Master in Mathematics**, *Università degli Studi di Udine*, Udine.
Mark: 110/110 *cum laude*

2005–2008 **Bachelor in Mathematics**, *Università degli Studi di Udine*, Udine.
Mark: 110/110 *cum laude*

Research interests

Partial differential equations, Reaction-diffusion equations, propagation speeds in heterogeneous environments, comparison methods, multiplicity in superlinear indefinite elliptic problems, continuation methods, topological methods.

Ordinary differential equations, Topological methods, qualitative behavior of solutions.

Variational methods in peridynamics, Variational methods, nonlocal problems.

Numerical analysis, Path following, numerical bifurcation diagrams, spectral methods.

Mathematical modelling, Models in ecology, epidemiology and medicine.

Papers and preprints

[1] **A. Tellini**, *High multiplicity of positive solutions for superlinear indefinite problems with homogeneous Neumann boundary conditions*, J. Math. Anal. Appl., **467** (2018) 673–698.

[2] **A. Tellini**, *Comparison among several planar Fisher-KPP road-field systems*, To appear in Springer INdAM Series.

[3] **L. Rossi, A. Tellini and E. Valdinoci**, *The effect on Fisher-KPP propagation in a cylinder with fast diffusion on the boundary*, SIAM J. Math. Anal., **49** (2017), 4595–4624.

[4] **A. Tellini**, *Propagation speed in a strip bounded by a line with different diffusion*, Journal of Differential Equations, **60** (2016), 5956–5986.

[5] **A. Tellini**, *Imperfect bifurcations via topological methods in superlinear indefinite problems*, Discrete Contin. Dyn. Syst., Dynamical systems, differential equations and applications. 10th AIMS Conference. Suppl. (2015), 1050–1059.

[6] **J. López-Gómez, M. Molina-Meyer and A. Tellini**, *Spiraling bifurcation diagrams in superlinear indefinite problems*, Discrete and Continuous Dynamical Systems A, **35** (2015), 1561–1588.

[7] **J. López-Gómez and A. Tellini**, *Generating an arbitrarily large number of isolas in a superlinear indefinite problem*, Nonlinear Analysis Series A: Theory, Methods & Applications, **108** (2014), 223–248.

[8] **J. López-Gómez, M. Molina-Meyer and A. Tellini**, *Intricate dynamics caused by facilitation in competitive environments within polluted habitat patches*, European Journal of Applied Mathematics **25** (2014), 213–229.

[9] **J. López-Gómez, A. Tellini and F. Zanolin**, *High multiplicity and complexity of the bifurcation diagrams of large solutions for a class of superlinear indefinite problems*, Communications on Pure and Applied Analysis **13** (2014), 1–73.

[10] **J. López-Gómez, M. Molina-Meyer and A. Tellini**, *Intricate bifurcation diagrams for a class of one-dimensional superlinear indefinite problems of interest in population dynamics*, Dynamical Systems and Differential Equations, DCDS Supplement 2013 Proceedings of the 9th AIMS International Conference (Orlando, Florida, USA), 515–524.

[11] **J. López-Gómez, M. Molina-Meyer and A. Tellini**, *The uniqueness of the linearly stable positive solution for a class of superlinear indefinite problems with nonhomogeneous boundary conditions*, Journal of Differential Equations **255** (2013), 503–523.

Academic Production

Ph.D. Thesis

Title *Mathematical analysis and numerical treatment of a class of superlinear indefinite boundary value problems of elliptic type*

Supervisors Professors Julián López Gómez and Marcela Molina Meyer

Jury Paul Rabinowitz *(University of Wisconsin - Madison)*, Jean Mawhin *(Université Catholique de Louvain)*, Fabio Zanolin *(Università degli Studi di Udine)*, Carlos Fernández Pérez *(Universidad Complutense de Madrid)*, Mihaela Negreanu Pruna *(Universidad Complutense de Madrid)*.

External referees Duccio Papini *(Università degli studi di Siena)*, Laurent Véron *(Université François Rabelais - Tours)*

Link http://eprints.ucm.es/23420/1/T34870.pdf

Master Thesis (Universidad Complutense de Madrid)

Title *Multiplicity of positive large solutions in a superlinear indefinite problem*

Supervisor Professor Julián López Gómez

Master Thesis (Università degli Studi di Udine)

Title *Positive blow-up solutions for a class of nonlinear differential equations*

Supervisors Professors Fabio Zanolin and Julián López Gómez

Bachelor Thesis (Università degli Studi di Udine)

Title *Persistence in continuous dynamical systems, with applications to population dynamics*

Supervisor Professor Fabio Zanolin

Grants

Feb 2017 – Jan 2019 PostDoc Contract Juan de la Cierva Incorporación (Ministry of Economy, Industry and Competitiveness, Spain)

Oct 2014– March 2016 PostDoc project of the Institute of Complex Systems of Île de France (Supervisor Prof. Henri Berestycki)

Oct 2010–Sept 2014	FPI Doctoral Grant (Trainee researcher) of the Ministry of Economy and Competitiveness of the Government of Spain (former Ministry of Science and Innovation)
2005–2010	Grant of the *Scuola Superiore dell'Università degli Studi di Udine - Classe scientifico-economica*, given at the beginning of the bachelor studies to at most 10 students who pass a written and oral examination, much like the *Scuola Normale Superiore di Pisa*

Academic Visits

11/07/18–30/07/18	Research visit at Harbin Institute of Technology, Harbin (China)
25/08/13–23/11/13	Research period at the "Centre d'Analyse et Mathématique Sociales"(Paris), supervision of Prof. H. Berestycki
13/01/13–13/04/13	Research period at the "Centre d'Analyse et Mathématique Sociales"(Paris), supervision of Prof. H. Berestycki
09/09/09–28/02/10	Erasmus at the Faculty of Mathematics, Universidad Complutense de Madrid, supervision of Prof. J. López Gómez

Participation in research projects

Oct 2010–Dic 2012	MTM2009-08259 "Metasolutions in spatial ecology", Ministry of Science and Innovation (Spain)
Jan 2013–Dic 2015	MTM2012-30669 "Nonlinear elliptic and parabolic equations", Ministry of Economy and Competitiveness (Spain)
From Oct 2014	"ReaDi: Reaction Diffusion Equations, Propagation and Modelling", ERC (European Research Council)
From Jan 2016	MTM2015-65899-P "Nonlinear Elliptic and Parabolic Problems", Ministry of Economy and Competitiveness (Spain)

Peer reviewing activity

Journals	Nonlinear Analysis: Theory, Methods & Applications, Journal of Differential Equations, Communications on Pure and Applied Analysis, European Journal of Applied Mathematics, Annali di Matematica Pura ed Applicata

Reviewing activity

Mathematical Reviews (American Mathematical Society), zbMath

Talks

18/07/18	Road-field systems in domains with bounded section, *Seminar of the Department of Mathematics* (Harbin Institute of Technology, China)
07/07/18	Propagation Enhancement for Fisher-KPP Problems with Diffusion and Reaction Heterogeneities in Adjacent Domains, *12th AIMS international conference on Dynamical Systems, Differential Equations and Applications, Taipei (Taiwan)*, Invited talk in Special Session "Propagation Dynamics in Nonlinear Evolution Systems"

06/07/18 High Multiplicity of Positive Solutions for Superlinear Indefinite Problems with Neumann Boundary Conditions, *12th AIMS international conference on Dynamical Systems, Differential Equations and Applications, Taipei (Taiwan)*, Invited Talk in Special Session "Nonlinear Elliptic and Parabolic Problems"

14/02/18 Comparison principles: differential equations and beyond, *Junior Seminar* (ICMAT, Madrid, Spain)

21/12/17 Reaction-diffusion systems with heterogeneities in adjacent domains, *Workshop on Nonlinear Differential Equations"* (University of Trieste, Italy), Invited

23/11/17 Reaction-diffusion systems with heterogeneities in adjacent domains, *International conference "Reaction-diffusion, Propagation, Modelling"* (Henri Poincaré Institute, Paris), Invited

05/09/17 Enhancement of Fisher-KPP propagation through lines and strips of fast diffusion, *IV Conference of the Royal Spanish Mathematical Society of young researchers* (Valencia, Spain), Invited talk in the Special Session "PDEs and applications"

07/07/17 Effects of large diffusion on the boundary for Fisher-KPP systems, *Workshop on Nonlinear Partial Differential Equations*, Universidad Complutense de Madrid (Spain), Invited

08/06/17 Enhancement of Fisher-KPP propagation through lines and strips of fast diffusion, *Seminar of nonlinear diffusion*, Universidad Autónoma de Madrid (Spain), Invited

31/05/17 Enhancement of Fisher-KPP propagation through lines and strips of fast diffusion, *Conference "Contemporary Research in elliptic PDEs and related topics"*, Università di Bari (Italy) - INdAM intensive research period, Invited

05/04/17 Aceleración de la propagaciónn de tipo Fisher-KPP a través de líneas de difusión rápida, *Seminar of the group "Optimización y métodos variacionales"*, Universidad de Castilla La Mancha (Ciudad Real, Spain), Invited

22/12/16 High multiplicity of positive solutions for a superlinear indefinite problem with Neumann boundary conditions, *Workshop of the INdAM-GNAMPA project "Nonlinear differential problems: existence, multiplicity and qualitative properties of the solutions"*, University of Udine (Italy), Invited

14/12/16 Enhancement of Fisher-KPP propagation through lines and strips of fast diffusion, *Colloquium of the Department of Mathematics*, University of Miami (USA), Invited

04/07/16 Acceleration of Fisher-KPP propagation in presence of reaction and diffusion heterogeneities, *11th AIMS international conference on Dynamical Systems, Differential Equations and Applications, Orlando (USA)*, Invited talk in Special Session "New Trends in Nonlinear Partial Differential Equations and Applications"

01/07/16 Global bifurcation diagrams for problems with sign-changing nonlinearities with high multiplicity of solutions, *11th AIMS international conference on Dynamical Systems, Differential Equations and Applications, Orlando (USA)*, Talk in Special Session "Qualitative properties of nonlinear differential equations of elliptic and parabolic type"

05/04/16 Accélération de la propagation Fisher-KPP en présence d'hétérogénéités, *Institut de Mathématiques de Marseille (Marseille, France)*, Applied Analysis Seminar, Invited

23/03/16 Accélération de la propagation Fisher-KPP en présence d'hétérogénéités, *(Bordeaux, France)*, Workshop of young french researchers on PDEs, Invited

28/01/16 Diagrammes de bifurcation complexes pour des équations logistiques de type indéfini, *Institut de Mathématiques de Bordeaux (Bordeaux, France)*, Analysis Seminar, Invited

19/12/15 Bifurcation diagrams for superlinear indefinite problems with asymmetric weights, *Universidad Complutense de Madrid (Spain)*, Workshop on Nonlinear Partial Differential Equations

13/10/15 Global bifurcation diagrams for superlinear indefinite problems with high multiplicity of solutions, *Institut Elie Cartan de Lorraine (Nancy, France)*, PDE Seminar, Invited

12/10/15 Acceleration of Fisher-KPP propagation due to heterogeneities on the boundary, *Laboratoire Amiénois de Mathématique Fondamentale et Appliquée (Amiens, France)*, Analysis Seminar A^3, Invited

10/09/15 Global bifurcation diagrams for superlinear indefinite problems with high multiplicity of solutions, *XX Conference of the Italian Mathematical Union*, Special Session on Ordinary Differential Equations, Invited Talk

19/06/15 Acceleration of Fisher–KPP propagation due to heterogeneities on the boundary, *Universidad Complutense de Madrid (Spain)*, Workshop on Nonlinear Partial Differential Equations

06/02/15 Propagation in a cylinder with fast diffusion and transport on the boundary, *Universidad Complutense de Madrid (Spain)*, Seminar of the Department of Applied Mathematics

06/11/14 The effect of two roads with fast diffusion on Fisher-KPP propagation, *ERC ReaDi Seminar, Paris, EHESS*, Short Seminar

06/10/14 Global bifurcation diagrams for superlinear indefinite problems with high multiplicity of solutions, *ERC ReaDi Workshop, Paris, EHESS*, Long Seminar

23/09/14 The effect of fast diffusion occurring on sub-environments of lower spatial dimension, *Workshop of Young Researchers in Mathematics, Universidad Complutense de Madrid*, Invited Talk

07/07/14–11/07/14 The effect of two roads with fast diffusion on Fisher-KPP propagation, *10th AIMS international conference on Dynamical Systems, Differential Equations and Applications, Madrid (Spain)*, Invited talk in Special Session "Nonlinear elliptic and parabolic problems"

27/11/13 High multiplicity for superlinear indefinite problems, *Universidad Complutense de Madrid (Spain)*, Seminar of the Department of Applied Mathematics, Invited Seminar

21/10/13 High multiplicity for superlinear indefinite problems, *Università degli Studi di Padova (Italy)*, Seminar of differential equations and applications

18/10/13 How a line bounding a strip-shaped field affects Fisher-KPP propagation, *Università degli Studi di Trieste (Italy)*, Seminar

25/09/13 How a line bounding a strip-shaped field affects Fisher-KPP propagation, *Journées ERC ReaDi (European Research Council's Project Reaction Diffusion Equations), Paris, EHESS*, Invited Talk

17/07/13	Intricate dynamics in superlinear indefinite problems, *Giornate non lineari, Università degli Studi di Torino*, Invited Talk
19/06/13	Intricate dynamics caused by facilitation in polluted habitats, *Workshop on nonlinear PDEs, Universidad Complutense de Madrid*, Plenary Talk
13/06/13	Intricate dynamics in superlinear indefinite problems, *Seminar of the Group of Applied Mathematical Analysis (GAMA), University Carlos III Madrid*, Seminar
27/03/13	Intricate dynamics caused by facilitation in polluted habitats, *Workgroup on nonlinear PDEs of the Centre d'Analyse et Mathématique Sociales (Paris)*, Seminar
01/07/12–05/07/12	Theoretical and numerical analysis of complex bifurcation diagrams related to a class of superlinear indefinite problems, *9th AIMS international conference on Dynamical Systems, Differential Equations and Applications, Orlando (Florida, USA)*, Invited talk in Special Session "Nonlinear elliptic and parabolic problems"
29/09/11	Complexity of the global bifurcation diagrams of large solutions for a class of superlinear indefinite equations, *Workshop on Nonlinear Partial Differential Equations, Universidad Complutense de Madrid*, Plenary Talk
22/09/11	Multiplicity of positive large solutions in a superlinear indefinite problem, *Workshop of Young Researchers in Mathematics, Universidad Complutense de Madrid*, Plenary Talk
09/05/11	Some multiplicity results for a class of superlinear indefinite problems, *Workshop on Nonlinear Partial Differential Equations, Universidad Complutense de Madrid*, Plenary Talk

Teaching experience

January 2018 – June 2018	Theory and exercices of Matemáticas II (Ordinary differential equations), 1st year of the Bachelor degree in Chemical Engineering at Universidad Autónoma de Madrid, *(60 hours)*
February 2017 – June 2017	Theory and exercices of Matemáticas II (Ordinary differential equations), 1st year of the Bachelor degree in Chemical Engineering at Universidad Autónoma de Madrid, *(60 hours)*
Sept 2016 – January 2017	Theory and Exercises of Linear Algebra, 1st year of the Bachelor degree in Mathematics, Computer Science and Economics at Université Paris Dauphine, *(72 hours)*
February–May 2014	Exercises of Classical Theory of Partial Differential Equations in the 3rd year of the double Bachelor degree in Mathematics and Physics at Universidad Complutense de Madrid, *(26 hours)*
December 2012	Exercises of Classical Theory of Partial Differential Equations in the 4th year of the Bachelor degree in Mathematics at Universidad Complutense de Madrid, *(3 hours)*
December 2012	Exercises of Ordinary Differential Equations in the 3rd year of the Bachelor degree in Mathematics at Universidad Complutense de Madrid, *(4 hours)*

Organization of conferences and seminars

Jan-May 2016	ReaDi seminar on PDEs, 15 sessions (link)
Feb-Apr 2016	CAMS student's seminar, 3 sessions

Mar-June 2015	Seminar "Between discrete and continuous", Insitut des Systèmes Complexes Paris Île-de-France, 4 sessions, 5 speakers, (link)
Jan-May 2015	ReaDi seminar on PDEs, 9 sessions 11 speakers (link)
19/06/13–20/06/13	Workshop on nonlinear Partial Differential Equations, *Universidad Complutense de Madrid (Spain)*
19/09/12–21/09/12	Workshop of Young Researchers in Mathematics, *Universidad Complutense de Madrid (Spain)*

Attended conferences and courses

- *Nonlinear Models in Partial Differential Equations*, Toledo (Spain), June 2011
- *Workshop of Young Researchers in Mathematics*, Universidad Complutense de Madrid (Spain), September 2012
- *Biological invasions and evolutionary biology, stochastic and deterministic models*, Lyon (France), March 2013
- *Partial Differential Equations and Geometric Measure Theory*, Cetraro (Cosenza, Italy), June 2014
- *Workshop "Mathematical Models for Social Sciences"*, University Paris 6, December 2014
- *Workshop "Mathematics and Social Sciences"*, Imperial College, London, November 2015

Languages

Italian	**Mothertongue**	
English	**Proficiency**	
Spanish	**Proficiency**	*Certificate DELE, Instituto Cervantes, C2 level*
French	**Advanced**	*Certificate DALF, C1 level*
German	**Intermediate**	*Zertifikat Deutsch, Goethe institute, B1 level*

Computer skills

Mathematical Softwares	Matlab (advanced), Mathematica (advanced), Geogebra (intermediate), Maple (basic), FreeFem++ (basic)
Programming languages	C++ (basic), Fortran (basic)
Text editors	LaTeX(advanced)
Others	European Computer Driving Licence