

Personal Information

 <https://www.elisasovrano.it>

 elisasovrano@gmail.com  elisa.sovrano@ehess.fr  [elisasovrano](#)

 <https://orcid.org/0000-0003-4085-9103>

Introduction

My research is driven in the area of nonlinear analysis concerning the theory of ordinary and partial differential equations and chaotic dynamical systems. My research recent interests lie in the study of: (i) existence, multiplicity, and qualitative properties of solutions for certain BVPs associated with semilinear and quasilinear elliptic differential equations; (ii) existence and qualitative properties of wavefronts type solutions for certain reaction-diffusion equations associated with nonlinear diffusion and transmission conditions. I am interested in population biology applications, and I deal with dynamical systems theory, topological and variational methods, and bifurcation techniques.

Indicators of scientific production: (Scopus. Documents: 16, total citations: 77, h-index: 5); (Google Scholar. Total citations: 94, h-index: 6).

Academic Career

2019/11/01–to date: Postdoc researcher funded by FSMP (Fondation Sciences Mathématiques de Paris) at CNRS - CAMS (Centre d'Analyse et de Mathématique Sociales) - EHESS (École des Hautes Études en Sciences Sociales), Paris (France), supervised by Prof. H. Berestycki.

2019/01/01–2019/10/31: Postdoc researcher funded by INdAM (Istituto Nazionale di Alta Matematica) at the Department of Mathematics and Geosciences, University of Trieste, Italy, supervised by Prof. P. Omari.

2018/07/01–2018/12/31: Postdoc researcher at CMUP (Centre for Mathematics of the University of Porto), Portugal, supervised by Prof. I. S. Labouriau.

2018/03/07–2018/04/11: Visiting researcher at CMAF-CIO (Center for Mathematics, Fundamental Applications and Operations Research), University of Lisbon, Portugal, funded by CMAF-CIO.

2018/02/26: PhD (cum laude) in Computer Science, Mathematics and Physics, University of Udine, Italy. Mention Doctor Europæus. Title of the thesis: *Nonlinear differential equations having non-sign-definite weights*. Supervisor: Prof. F. Zanolin.

2015–2018: Collaborator at the Department of Mathematics, Computer Science and Physics, University of Udine, Italy (as **Teaching assistant** and **Instructor**).

2014/03/19: MSc (cum laude) in Mathematics, University of Udine, Italy. Title of the thesis: *Snap-back repellers*. Advisor: Prof. F. Zanolin.

Scientific Qualification

2020/11/09–2029/11/09: ANS 2018-2020 – Italian National Scientific Habilitation as Associate Professor (*certificate*)

Visits and International Collaborations

2019: University of Ferrara (Prof. A. Corli); University of Porto (Prof. I. S. Labouriau).

2018: University of Chicago (Prof. T. Dupont, Prof. T. Nagylaki); University of Vienna (Prof. R. Bürger); University of Lisbon (Prof. C. Rebelo); University of Torino (Dr. A. Boscaggin, Dr. G. Feltrin).

2017: University of Lisbon (Prof. C. Rebelo); University of Vigo (Prof. E. Liz).

2016: University of Lisbon (Prof. C. Rebelo).

Papers & Reviews

Published Documents


- [1] E. Sovrano. How to Construct Complex Dynamics? A Note on a Topological Approach. **Internat. J. Bifur. Chaos Appl. Sci. Engrg.**, 30(2):2050034, 7, 2020.
- [2] P. Omari and E. Sovrano. Positive solutions of superlinear indefinite prescribed mean curvature problems. **Commun. Contemp. Math.**, 2020. <https://doi.org/10.1142/S0219199720500170>.
- [3] P. Omari and E. Sovrano. Positive solutions of indefinite logistic growth models with flux-saturated diffusion. **Nonlinear Anal.**, 201:111949, 26, 2020.
- [4] I. S. Labouriau and E. Sovrano. Chaos in periodically forced reversible vector fields. **J. Singul.**, 22:227–240, 2020.
- [5] A. Boscaggin, G. Feltrin, and E. Sovrano. High Multiplicity and Chaos for an Indefinite Problem Arising from Genetic Models. **Adv. Nonlinear Stud.**, page 000010151520202094, 2020.
- [6] G. Feltrin, E. Sovrano, and F. Zanolin. Periodic solutions to parameter-dependent equations with a ϕ -Laplacian type operator. **NoDEA Nonlinear Differential Equations Appl.**, 5(5):Paper No. 38, 27, 2019.
- [7] E. Sovrano and F. Zanolin. Ambrosetti-Prodi periodic problem under local coercivity conditions. **Adv. Nonlinear Stud.**, 18(1):169–182, 2018.
- [8] E. Sovrano. A negative answer to a conjecture arising in the study of selection-migration models in population genetics. **J. Math. Biol.**, 76(7):1655–1672, 2018.
- [9] E. Sovrano. Ambrosetti-Prodi type result to a Neumann problem via a topological approach. **Discrete Contin. Dyn. Syst. Ser. S**, 11(2):345–355, 2018.
- [10] G. Feltrin and E. Sovrano. Three positive solutions to an indefinite Neumann problem: a shooting method. **Nonlinear Anal.**, 166:87–101, 2018.
- [11] G. Feltrin and E. Sovrano. An indefinite nonlinear problem in population dynamics: High multiplicity of positive solutions. **Nonlinearity**, 31(9):4137–4161, 2018.

- [12] E. Sovrano and F. Zanolin. A periodic problem for first order differential equations with locally coercive nonlinearities. **Rend. Istit. Mat. Univ. Trieste**, 49:335–355, 2017.
- [13] E. Sovrano and F. Zanolin. Indefinite weight nonlinear problems with Neumann boundary conditions. **J. Math. Anal. Appl.**, 452(1):126–147, 2017.
- [14] E. Sovrano and F. Zanolin. The Ambrosetti-Prodi periodic problem: Different routes to complex dynamics. **Dynam. Systems Appl.**, 26:589–626, 2017.
- [15] E. Sovrano. About Chaotic Dynamics in the Twisted Horseshoe Map. **Internat. J. Bifur. Chaos Appl. Sci. Engrg.**, 26(6):1650092, 10, 2016.
- [16] E. Sovrano and F. Zanolin. Remarks on dirichlet problems with sublinear growth at infinity. **Rend. Istit. Mat. Univ. Trieste**, 47:267–305, 2015.
- [17] E. Sovrano and F. Zanolin. Dolcher fixed point theorem and its connections with recent developments on compressive/expansive maps. **Rend. Istit. Mat. Univ. Trieste**, 46:101–121, 2014.

ArXiv Preprints

G. Feltrin, E. Sovrano, A. Tellini, On the number of positive solutions to an indefinite parameter-dependent Neumann problem <https://arxiv.org/abs/2101.03313>

Review Activity

Certified reviews for 6 international journals: Advances in Difference Equations; Boundary Value Problems; Mathematische Nachrichten; Nonlinear Analysis; Open Mathematics; Rocky Mountain Journal of Mathematics (see )

Conferences

Communications

2019	<p>International Workshop on Differential Equations (Lisbon, Portugal, 2019/09/05–06) Contributed Talk (CT): <i>Positive solutions of a superlinear indefinite prescribed mean curvature problem.</i></p> <p>International Conference on Differential & Difference Equations and Applications (Lisbon, Portugal, 2019/07/01–05/07). Invited Talk (IT): <i>An indefinite nonlinear problem in population genetics: high multiplicity and chaos.</i></p>
2018	<p>ReaDi meeting: Reaction-diffusion equations, Modelling and Social sciences (Paris, France, 2018/12/06–07). IT: <i>Multiplicity of positive solutions for indefinite nonlinear problems in population genetics.</i></p> <p>Giornate di Equazioni Differenziali Ordinarie: metodi e prospettive (Ancona, Italy, 2018/09/27–29). IT: <i>About indefinite Neumann problems with oscillating nonlinear potentials: multiplicity of positive solution.</i></p> <p>International Conference on Nonlinear Analysis and Boundary Value Problems (Santiago, Spain, 2018/09/04–07). IT: <i>Chaos in a family of difference equations: a topological proof.</i></p> <p>11th European Conference on Mathematical and Theoretical Biology (Lisbon, Portugal, 2018/07/23–27). Poster: <i>High multiplicity of positive solutions to indefinite problems arising in population genetics.</i></p> <p>12th AIMS Conference on Dynamical Systems Differential Equations and Applications (Taipei, Taiwan, 2018/07/05–09). ITs: <i>Ambrosetti-Prodi type result under local coercivity conditions; Existence and multiplicity of periodic solutions to local coercive equations with a ϕ-Laplacian type operator.</i></p>

	<p>Mini-workshop on ExtraOrdinary Differential Equations (Lisbon, Portugal, 2018/03/28–30). IT: <i>Multiplicity of positive solutions for some indefinite problems.</i></p> <p>9th Workshop DSABNS (Torino, Italy, 2018/02/07–09). CT: <i>Indefinite nonlinear weight problems in population genetics.</i></p>
2017	<p>Intensive week of PDEs at Spa (Spa, Belgium, 2017/12/11–15). IT: <i>Indefinite nonlinear problems in population genetics: multiplicity of positive solutions.</i></p> <p>Equadiff 2017 (Bratislava, Slovakia, 2017/07/24–28). Poster: <i>Ambrosetti-Prodi boundary value problems: multiplicity of solutions and chaotic dynamics.</i> IT: <i>Multiplicity of positive solutions for indefinite weight problems motivated by population genetics.</i></p> <p>International Conference on Differential & Difference Equations and Applications (Amadora, Portugal, 2017/06/05–09). CT: <i>Multiplicity of positive solutions for indefinite Neumann problems with an oscillating nonlinear potential.</i></p>
2016	<p>Nonlinear Meeting in Udine 2017 on the occasion of Pierpaolo Omari's 60th birthday (Udine, Italy, 2016/01/23–26). CT: <i>Neumann problems with indefinite weight: modelling population genetics.</i></p> <p>ODEs Under Christmas Trees (Udine, Italy, 2016/12/22). IT: <i>Neumann problems with indefinite weight: modelling population genetics.</i></p> <p>11th AIMS Conference on Dynamical Systems Differential Equations and Applications (Orlando, Florida, 2016/07/01–04). ITs: <i>Chaotic Dynamics in the Twisted Horseshoe Map Via a Topological Approach; Remarks on the Ambrosetti-Prodi Periodic Problem.</i></p> <p>Boundary Value problems in FVG (SISSA, Trieste, Italy, 2016/02/04). IT: <i>Positive solutions of Dirichlet problems with an indefinite weight.</i></p>
2015	<p>VII Symposium on Nonlinear Analysis SNA 2015, (Toruń, Poland, 2015/09/14–18). CT: <i>Positive solutions of Dirichlet problems with an indefinite weight.</i></p>

Invited Seminars

University of Picardy Jules Verne (2019/12/09); University of Chicago (2018/11/14); University of Porto (2018/09/21); University of Vigo (2017/03/31); University of Lisbon (2016/07/14); University of Udine (2015/07/14).

Organization of Scientific Meetings

Nonlinear Meeting 2021 (Zoom, 2021/03/22-23), <https://deg1.uniud.it/nlm2021/> (co-organizer with G. Feltrin, P. Gidoni, A. Tellini).

Christmas Meeting 2020 (Zoom, 2020/12/17), <https://deg1.uniud.it/xmas2020/index.html> (co-organizer with G. Feltrin, P. Gidoni, A. Tellini).

Nonlinear Meeting in Udine 2017 (Udine, Italy, 2016/01/23–26), <https://sites.google.com/site/2017nlmu/> (co-organizer with T. Dondè, F. Obersnel, D. Papini, F. Zanolin).

Teaching Activities

AY 2017–2018: *Mathematical Analysis* (Teaching Assistant with Prof. F. Zanolin) at BSc Engineering Univ. Udine; *Advanced Geometry* (Teaching Assistant with Prof. F. Zucconi) at BSc Mathematics Univ. Udine; *Mathematical Analysis* (Teaching Assistant with Prof. E. Cabib); BSc Mathematics Univ. Udine; *Precalculus* (Instructor) at BSc Engineering Univ. Udine;

AY 2015–2016: *Mathematical Analysis* (Teaching Assistant with Prof. F. Zanolin) at BSc Mathematics Univ. Udine; *Precalculus* (Instructor) at BSc Engineering Univ. Udine.

Research Projects & Awards

Individual projects

2019/11/01–2021/10/31: FSMP (Fondation Sciences Mathématiques de Paris), France. PI of the project: “*Reaction-Diffusion Equations in Population Genetics: a study of the influence of geographical barriers on traveling waves and non-constant stationary solutions.*” **Postdoc fellowship.**

2019/01/01–2019/10/31: INdAM (Istituto Nazionale di Alta Matematica “F. Severi”), Italy. PI of the project: “*Problems in Population Dynamics: from Linear to Nonlinear Diffusion.*” **Postdoc fellowship.**

Group projects

INdAM-GNAMPA project 2020. Research group funding: “*Problemi ai limiti per l’equazione della curvatura media prescritta.*”

INdAM-GNAMPA project 2018. Research group funding: “*Problemi differenziali con peso indefinito: tra metodi topologici e aspetti dinamici.*”

INdAM-GNAMPA project 2017. Research group funding: “*Problemi differenziali non lineari: esistenza, molteplicità e proprietà qualitative delle soluzioni.*”

INdAM-GNAMPA project 2016. Research group funding: “*Problemi al contorno associati ad alcune classi di equazioni differenziali non lineari.*”

Awards

Ph.D. Thesis Award 2019 in the field of Computer science, Mathematics and Physics, University of Udine (2019/05/31), Italy.