*Curriculum Vitae (updated 24/01/2024)*

## Personal Information


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|---|---|
| Surname/First name | Bulai Iulia Martina |
| e-mail (PEC) | imbulai@uniss.it (martina.bulai@pec.it) |
| Nationality | Italian/Roumanian |
| Date of Birth | 27/06/1988 |
| Webpage | https://iuliamartinabulai.github.io |


## Education

FEB 2017 **Ph.D. in Mathematics**, *University of Torino*.
Supervisor Prof. Ezio Venturino

2013 **Master of Science in Mathematics**, *University of Torino*.
Supervisor Prof. Elena Cordero

2011 **Bachelor's degree in Mathematics**, *University of Torino*.

## Current position and previous positions

JAN 2022–present **Research Assistant Professor in Analysis, (Ricercatrice a tempo determinato di tipo B - SSD: MAT/05 , MAT/08)**, *Department of Chemical, Physical, Mathematical and Natural Sciences, University of Sassari*.

AUG 2019–DEC 2021 **Research Assistant Professor in Numerical Analysis, (Ricercatrice a tempo determinato di tipo A - SSD: MAT/08)**, *Department of Mathematics, Informatics and Economics, University of Basilicata*.

MAR 2017–MAR 2019 **Post-Doc Research Fellow**, *Department of Information Engineering, University of Padova*, Department of excellence (2018 - 2022).
Supervisor Prof. Morten Gram Pedersen

MAR 2019–JUL 2019 **Post-Doc Research Fellow**, *Department of Information Engineering, University of Padova*, Department of excellence (2018 - 2022).
Supervisor Prof. Morten Gram Pedersen

## Qualifications

JAN 2023–JAN 2033 Abilitazione Scientifica Nazionale per Professore di II fascia in MAT/08, (National Scientific Qualification for Associate Professor in Numerical Analysis)

## Supervision

### Undergraduate students:

2022 Martina Salvia, An epidemiological mathematical model assuming non well-mixed population, an application to Covid-19

2022 Stefania Allegretti, Modeling oncolytic virotherapy

### Scholarships:

2022 Scientific advisor of a 5 months scholarship: "Studio di modelli epidemiologici caratterizzati da classi non omogenee con applicazione a Covid-19".

2023-2024 Scientific advisor of a 8 months scholarship: "Study of mathematical models for population dynamics and biodiversity distribution".

## Commission of trust

Scientific Journal Referee: Nonlinear Dynamics; Advances in Difference Equations; BioSystems; Mathematics and Computers in Simulation; Biometrical Journal; Applied Mathematics and Computation; Fractal and Fractional; IFAC-PapersOnLine; Mathematics; International Journal of Environmental Research and Public Health; Chaos, Solitons and Fractals; Applied Numerical Mathematics; Letters in Biomathematics; International Journal of Modeling, Simulation, and Scientific Computing; Letters in Biomathematics; Annali dell'Università di Ferrara; Symmetry; Mathematical Modelling and Numerical Simulation with Applications; Journal of Biological Systems; Plos One; Mathematics and Computers in Simulation; Dolomites Research Notes on Approximation

Editorial board/Review Editor: Mathematical Modelling and Numerical Simulation with Applications (MMNSA) 2022-present; Frontiers in Complex Systems, Multi and cross disciplinary complexity, 2022-present, Plos Complex systems, 2023-present.

Scientific evaluator: Admitted to the Register of Expert Peer Reviewers for Italian Scientific Evaluation (RePRISE)-1 project evaluated

Council member: Council member of Complex System Society, 2020-2026

Steering Committee Member of the Steering Committee for Conference on Complex Systems, CCS, 2020-2026

Program Committee International Conference on Complex Networks and their Applications 2021 and 2022; Conference on Complex Systems 2022, 2023; NetSci-X 2024.

## Teaching

2023/2024 Professor (titolare del corso) for bachelor in CTF (Chimica e Tecnologia Farmaceutica): Mathematics, 6CFU, 57h. University of Sassari.

2022/2023 Professor (titolare del corso) for bachelor in CTF (Chimica e Tecnologia Farmaceutica): Mathematics, 7CFU, 56h. University of Sassari.

2021/2022 Professor (titolare del corso) for bachelor in pharmacy: Mathematics (Matematica con elementi di informatica e statistica), 7CFU, 56h. University of Sassari.

2019/2020, 2020/2021 Professor (titolare del corso) for bachelor in mathematics: Complements of Scientific Computing (Complementi di calcolo scientifico), 6CFU, 56h. University of Basilicata.

2016/2017 Teaching assistant (professore a contratto) for bachelor in engineering: Analysis 1, 6CFU of 12 CFU, 50h. Politecnico di Torino.

2015/2016 Teaching assistant for bachelor in agrarian: Mathematics. University of Torino.

2009–2011 Private lessons at high school and secondary school students at Ludus in fabula, Almese.

## Memberships of scientific societies and groups

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|---|---|
| 2023–present | Member of Society for Industrial and Applied Mathematics, SIAM |
| 2022–present | Member of Approssimazione Numerica ed Analitica di dati e di Funzioni con Applicazioni SIMAI Subgroup, ANA&A |
| 2021–present | Member of Modellistica Socio-Epidemiologica UMI Subgroup, MSE |
| 2020–present | Member of Mathematical Epidemiology SMB Subgroup |
| 2020–present | Member of Mathematical Neuroscience SMB Subgroup |
| 2020–present | Member of Mathematical Oncology SMB Subgroup |
| 2020–present | Member of Teoria dell' Approssimazione e Applicazioni UMI Subgroup, T.A.A. |
| 2020–present | Member of Unione Matematica Italiana, UMI |
| 2020–present | Member of Società Italiana di Matematica Applicata e Industriale, SIMAI |
| 2019–present | Member of Research ITalian network on Approximation, RITA |
| 2019–present | Member of European Women in Mathematics, EWM |
| 2019–present | Member of Complex Systems Society, CCS |
| 2019 | Member of Biophysical Society, BPS |
| 2016–present | Member of Society for Mathematical Biology, SMB |
| 2016–present | Member of Gruppo Nazionale per il Calcolo Scientifico, GNCS-IN$\delta$AM |
| 2013–2015 | Member of Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni, GNAMPA-IN$\delta$AM |

## Mobility

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|---|---|
| SEP 2021 | University of Cagliari, Cagliari |
| OCT 2020-MAR 2021 | Medical Image Processing Lab, The lab is jointly between École polytechnique fédérale de Lausanne (EPFL) and the University of Geneva, Svizzera. OCT in presence and NOV-MAR in smart working. |
| JAN 2017 | Institute of Environmental Systems Research, Osnabrück |
| AUG-SEP 2016 | Institute of Environmental Systems Research, Osnabrück |
| SEP-MAR 2015 | Istituto Superiore Mario Boella (LACE), Torino |
| FEB-MAR 2014 | Numerical Harmonic Analysis Group (NuHAG), Vienna |

## Research areas of interest

- Graph signal processing applied to neuroimaging; Time-frequency analysis and applications
- Mathematical modeling with applications to real life problems, such as: cancer, Covid-19, electrical activity and Ca+ dynamics in endocrine cells, epidemiology, ecology, eco-epidemiologi, wastewater bioremediation
- Slow/fast bifurcation analysis; excitation waves

## Major collaborations

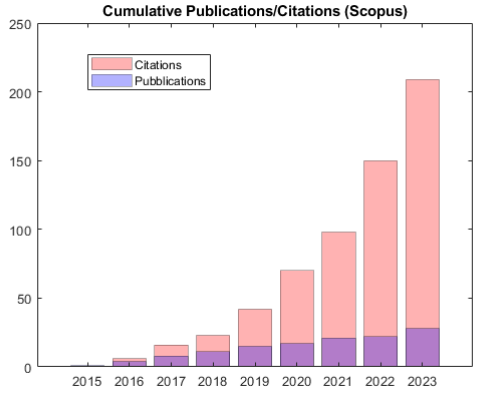
M. G. Pedersen, (Mathematical modelling of cellular processes, University of Padova, IT), E. Venturino, (Mathematical modelling, University of Torino, IT), S. Saliani (Harmonic analysis, University of Basilicata, IT) C. Berardo (Mathematical modelling, University of Helsinki, IT), E. Amico (Network neuroscience, EPFL,

CH), P. Baptista and T. Gomes (Biology, Polytechnic Institute of Braganca, PT), H. Laurie (Mathematical ecology, University of Cape Town, South Africa), P. K. Tiwari (Mathematical modelling, Kolkata University, India), A. K. Misra (Mathematical modelling, Banaras Hindu University, India), R. Bertram (Biomathematics and Neuroscience, Florida State University, Florida), T. Vo (Dynamical systems, Monash University, Victoria), F. Montefusco (Control Systems Engineering, Parthenope University of Naples, IT), F. Spina and G. C. Varese (environmental biotechnology, University of Torino, IT), F. Hilker (Modelling environmental and ecological systems, Osnabrück University, DE), M.C. De Bonis, C. Laurita, V. Sagaria (Numerical analysis, University of Basilicata, IT), A.S. Teixeira (Complex systems, University of Lisbon, PT).

## Publications

**Indicators related to scientific production: (updated on 08/12/2023)**

-Total number of citations 210 (Scopus), 307 (Google scholar)
-H index 6 (Scopus), 8 (Google scholar)
-Publications 28 (Scopus), 42 (Google scholar)




### Peer-reviewed journals

**JP27** F. Montefusco, A. Procopio, I. M. Bulai, F. Amato and C Cosentino, Role of ultrasensitivity in biomolecular circuitry for achieving homeostasis. To appear in *Nonlinear Dynamics*, 2024.

**JP26** F. Acotto, I. M. Bulai, E. Venturino, Prey herding and predators' feeding satiation induce multiple stability. *Communications in Nonlinear Science and Numerical Simulation*, 2023.

**JP25** I. M. Bulai, M. Salvia, Approximation of basins of attraction for bistable dynamical system for olive disease control. *Applied Numerical Mathematics*, 2023.

**JP24** I. M. Bulai, S. Saliani, Spectral graph wavelet packets frames. *Applied and Computational Harmonic Analysis*, 2023.

**JP23** I. M. Bulai, F. Montefusco, M.G. Pedersen, Stability analysis of a model of epidemic dynamics with nonlinear feedback producing recurrent infection waves. *Applied Mathematics Letters*, 2022.

**JP22** I.M. Bulai, M.C De Bonis, C. Laurita, V. Sagaria, MatLab Toolbox for the numerical solution of linear Volterra integral equations arising in metastatic tumor growth models. *Dolomites Research Notes on Approximation*, 2022.

**JP21** F. Montefusco, A. Procopio, I.M. Bulai, F. Amato, M.G. Pedersen and C. Cosentino, Interacting with COVID-19: How population behavior, feedback and memory shaped recurrent waves of the epidemic. *IEEE Control Systems Letters*, 2022.

**JP20** I.M. Bulai, M.C De Bonis, C. Laurita, V. Sagaria, Modeling metastatic tumor evolution, numerical resolution and growth prediction. *Mathematics and Computers in Simulation*, 2023.

**JP19** I.M. Bulai, E. Amico, How political choices shaped Covid connectivity: the Italian case study. *Plos One*, 2021.

**JP18** S. Allegretti, I. M. Bulai, R. Marino, M. A. Menandro and K. Parisi. Vaccination effect conjoint to fraction of avoided contacts on a Sars-Cov-2 mathematical model. *Mathematical Modelling and Numerical Simulation with Applications*, 2021.

**JP17** C. Berardo, I. M. Bulai, E. Venturino, Interactions Obtained from Basic Mechanistic Principles: Prey Herds and Predators. *Mathematics*, 2021.

**JP16** I. M. Bulai, A. C. Esteves, F. Lima, E. Venturino, A mathematical modeling approach to assess biological control of an orange tree disease. *Applied Mathematics Letters*, 2021.

**JP15** I. M. Bulai, S. Depickère, V. Hirata, E. Vargas Bernal, Influence of asymptomatic people on malaria transmission: a mathematical model for a low-transmission area case. *Journal of Biological Systems*, 2020.

**JP14** I. M. Bulai, F. Hilker, Eco-epidemiological interactions with predator interference and infection. *Theor Popul Biol*, 2019.

**JP13** N. Britton, I. M. Bulai, S. Saussure, N. Holst, E. Venturino, Can aphids be controlled by fungus? A mathematical model. *Applied Mathematics and Nonlinear Sciences*, 2019.

**JP12** I. M. Bulai, M. G. Pedersen, Stopping waves: Geometric analysis of coupled bursters in an asymmetric excitation field. *Nonlinear Dynamics*, 2019.

**JP11** P. Baptista, I. M. Bulai, T. Gomes, E. Venturino, Modeling the interactions among phythopatogens and phyllosphere microorganisms for the biological disease control of *Olea europaea* L.. *Mathematical Biosciences*, 2018.

**JP10** P. K. Tiwari, I. M. Bulai, F. Bona, E. Venturino, A. K. Misra, Human population effects on the Ulsoor lake fish survival. *Journal of Biological Systems*, 2018.

**JP9** I. M. Bulai, M. G. Pedersen, Hopf bifurcation analysis of the fast subsystem of a polynomial phantom burster model. *Dolomites Research Notes on Approximation*, 2018.

**JP8** I. M. Bulai, F. Spina, G. C. Varese, E. Venturino, Waste-water bioremediation using white rot fungi: validation of a dynamical system with real data obtained in laboratory. *Mathematical Methods in the Applied Sciences*, 2018.

**JP7** P. K. Tiwari, I. M. Bulai, A. K. Misra and E. Venturino, Modelling the direct and indirect effects of pollutants on the survival of fish in water bodies. *Journal of Biological Systems*, 2017.

**JP6** I. M. Bulai, E. Venturino. Shape effects on herd behaviour in ecological interacting population models. *Mathematics and Computers in Simulation*, 2017.

**JP5** I. M. Bulai, E. Venturino. Two mathematical models for dissolved oxygen in a lake. *Journal of Mathematical Chemistry*, 2017.

**JP4** M. Berra, I. M. Bulai, E. Cordero and F. Nicola. Gabor Frames of Gaussian Beams for the Schrödinger equation. *Applied and Computational Harmonic Analysis*, 2017.

**JP3** M. Righero, I. M. Bulai, M. A. Francavilla, F. Vipiana, Mirko Bercigli, A. Mori, M. Bandinelli, G. Vecchi. Hierarchical bases preconditioner to enhance convergence of the CFIE with multiscale meshes. *IEEE Antennas and Wireless Propagation Letters*, 2016.

**JP2** I. M. Bulai, E. Venturino. Biodegradation of organic pollutants in a water body. *Journal of Mathematical Chemistry*, 2016.

**JP1** I. M. Bulai, R. Cavoretto, B. Chialva, D. Duma, E. Venturino. Comparing disease-control policies for interacting wild populations. *Nonlinear Dynamics*, 2015.

### Book Chapters

**BC3** I. M. Bulai, Modeling COVID-19 Considering Asymptomatic Cases and Avoided Contacts. *Trends in Biomathematics: Modeling, Optimization and Computational Problems*, 2021.

**BC2** H. Laurie, E. Venturino, I. M. Bulai, Herding induced by encounter rate, with predator pressure influencing prey response. *Dynamical Systems in Biology and Natural Sciences (Springer-SIMAI series)*, 2019.

**BC1** P. Baptista, C.Berardo, I. M. Bulai, T. Gomes, E. Venturino, Modeling the endophytic fungus *Epicoccum nigrum* action to fight the "olive knot" disease caused by *Pseudomonas savastanoi* pv. *savastanoi (Psv)* bacteria in *Olea europea* trees. *Trends in Biomathematics: Modeling, Optimization and Computational Problems*, 2018

### Conference proceedings

**P8** I. M. Bulai, S. Saliani. Coefficients of Chebyshev Polynomial Approximation for Spectral Graph Wavelet Packet Kernels. *AIP Conference Proceedings,*, 2023.

**P7** F. Montefusco, I. M. Bulai, Exploiting Ultrasensitivity for Biomolecular Implementation of a Control System without Error Detection. To appear in *8th IFAC Conference on Foundations of Systems Biology in Engineering*, 2019.

**P6** I. M. Bulai, A.C. Esteves E. Venturino. A mathematical model for a diseased orange tree. *Proceedings of the 17th International Conference on Computational and Mathematical Methods in Science and Engineering*, 2017.

**P5** I. M. Bulai, E. Venturino. Competition between algae and fungi in a lake: a mathematical model. *Proceedings of the 16th International Conference on Computational and Mathematical Methods in Science and Engineering*, 2016.

**P4** I. M. Bulai, F. Spina, G. C. Varese, E. Venturino. Wastewater bioremediation using white rot fungi: validation of a dynamical system. *Biomath Communications*, Vol 3, No 1, 2016.

**P3** I. M. Bulai, E. Venturino. The Beddington-De Angelis and the HTII product response functions: application to polluted ecosystems biodegradation. *AIP Conference Proceedings,* AIP Conf. Proc. 1738, 390002 (2016).

**P2** I. M. Bulai, E. Venturino. A mathematical model for the biodegradation of organic pollutants in a lake. *Proceedings of the 15th International Conference on Computational and Mathematical Methods in Science and Engineering,* 2015.

**P1** I. M. Bulai, B. Chialva, D. Duma, E. Venturino. Do niches help in controlling disease spread in ecoepidemic models? *Proceedings of the 2013 International Conference on Computational and Mathematical Methods in Science and Engineering*, 2013.

### Submitted/Work in progress

**S3** I.M. Bulai, M.C De Bonis, C. Laurita, Numerical solution of metastatic tumor growth models with treatment.

**S2** I. M. Bulai, M. Sensi, S. Sottile, A geometric analysis of the SIRS compartmental model with fast information and misinformation spreading. Under review.

**S1** I. M. Bulai, A. S. Teixeira, Modeling a rehab-recovery-relapse cycle with community dependence via ODEs. Under review.

**WP6** I.M. Bulai, G. Orrù, T.J. Steger, Numerical computation of the combinatorial structure of the fundamental domain in the hyperbolic complex space.

**WP5** S. Bagella, I.M. Bulai, M. Malvasi, G. Orrù, Modeling interaction between autocton coastal area species and Carpobrotus.

**WP4** I. M. Bulai, J. Tabak-Sznajder, M. G. Pedersen, Bursting versus spiking: Systematic investigation of how patterns of electrical activity control local Ca2+ and hormone release.

**WP3** I. M. Bulai, T. Vo, R. Bertram, M. G. Pedersen, Burst of burst problem for a phantom bursting model.

**WP2** I. M. Bulai, S. Allegretti A mathematical model for oncolytic vaccinia virus dynamics.

**WP1** I. M. Bulai, M. Salvia, An epidemiological mathematical model assuming non well-mixed population, an application to Covid-19

### Other works

- I. M. Bulai, M. Righero, G.Vecchi, F. Vipiana, Algorithms for the generation of MR basis using interpolant gRWG and Algorithm for cell grouping strategy. *In cooperation with the research institute ISMB, LACE group.*

## Invited presentations to national and international conferences

FEB 2024 **Invited contributed talk** at 15th Conference on Dynamical Systems Applied to Biology and Natural Sciences (DSABNS 2024), Lisbona-PT.

DEC 2023 **Invited contributed talk** at Scientific toolkit for kernel-based approximation and its applications (SToK 2023), Camerino-IT.

SEP 2023 **Invited contributed talk** at International Conference of Numerical Analysis and Applied Mathematics (ICNAAM), Crete-EL.

SEP 2023 **Invited contributed talk** at International Association for Mathematics and Computers in Simulations (IMACS), Roma-IT.

AUG 2023 **Two invited contributed talks** at Italian Society of Applied and Industrial Mathematics (SIMAI), Matera-IT.

JUL 2023 **Invited contributed talk** at SIAM Conference on Control and Its Applications (CT23), Philadelphia, Pennsylvania-USA

JUL 2023 **Invited contributed talk** at the Workshop At the interface of Agriculture, Artificial Intelligence, Mathematics and Earth Observation applications (MathAIEOapp), Bari-IT.

JUN 2023 **Invited contributed talk** at Challenges and Advances in Numerical Analysis (CaNA), Cagliari-IT.

JUL 2022 **Invited contributed talk** at Functional Analysis, Approximation Theory and Numerical Analysis, Matera-IT.

JUN 2022 **Invited contributed talk** at Convegno e Assemblea GNCS 2022, Montecatini Terme–IT.

JUN 2022 **Invited contributed talk** at Models in Population Dynamics, Ecology and Evolution, Torino–IT.

SEP 2021 **Invited contributed talk** at 5th Dolomites Workshop on Constructive Approximation and Applications, 2021, Virtual.

JUL 2021 **Invited contributed talk** at ECCOMAS Young Investigators 2021, Virtual.

OCT 2020 **Invited contributed talk** at Virtual Advances in Differential Equations and Numerical Analysis, ADENA.

MAY 2020 **Invited contributed talk** at Seminari Padovani di Analisi Numerica, SPAN2020, Padova–IT. **Postponed**

FEB 2020 **Invited contributed talk** at Convegno e Assemblea GNCS 2020, Montecatini Terme–IT.

MAY 2018 **Invited contributed talk** and chair at Seminari Padovani di Analisi Numerica, SPAN2018, Padova–IT.

FEB 2018 **Invited contributed talk** at Convegno e Assemblea GNCS 2018, Montecatini Terme–IT.

DEC 2018 **Invited contributed talk** at International Workshop Modeling tools - Survey Meeting of the COST Action FA1405, Torino–IT.

MAY 2017 **Invited contributed talk** at 2nd International Workshop Franco-Italian Mathematical Ecology Days, Torino – IT.

## International conference contributions and schools

JUL 2023 **Contributed talk** at the Annual Meeting of the Society for Mathematical Biology (SMB), Columbus–USA.

JUN 2023 **Poster** at Dynamical Systems in the Life Sciences Conference (DSLS23), Columbus–USA.

JUN 2023 **Contributed talk** at the International Conference on Approximation Theory and Application, UMI-TAA. Cetraro–IT.

MAY 2023 **Contributed talk** at the Workshop Modellistica Socio-Epidemiologica, MSE. Napoli–IT.

FEB 2023 **Participant** at Workshop Software for Approximation, SA2023, Torino–IT.

JAN 2023 **Participant** at Approximation: Theory, Methods and Applications, ATMA2023, Padova–IT.

SEP 2022 **Contributed talk** at GIMC SIMAI YOUNG 2022 Workshop, Pavia–IT.

MAR 2022 **Poster** at SIAM Conference on Analysis of Partial Differential Equations (PD22), On-line.

FEB 2022 **Participant** at Workshop Software for Approximation, SA2022, On-line.

JAN 2022 **Participant** at Winter Workshop on Complex System, On-line.

NOV-DEC 2021 **Contributed talk** at the 10th International Conference on Complex Networks and their Applications. On-line.

NOV 2021 **Contributed talk** at Approximation: Theory, Methods and applications, ATMA2021, Reggio Calabria–IT.

SEP 2021 **Contributed talk** at International Conference on Computational Harmonic Analysis, ICCHA2021, On-line.

AUG 2021 **Contributed talk** at 13th International Society for Analysis its Applications and Computations (ISAAC) Congress 2021, On-line.

FEB 2021 **Contributed talk** at SMB Mathematical Epidemiology and Math Education Joint Workshop 2021, On-line.

FEB 2021 **Participant** at Workshop Dynamical Systems Applied to Biology and Natural Sciences, DSABNS 2021, On-line.

FEB 2021 **Participant** at Winter Workshop on Complex System, On-line.

DEC 2020 **Poster** at Virtual Annual Conference on Complex Systems (ECCS or CCS).

NOV 2020 **Contributed talk** at Virtual 20th International Symposium on Mathematical and Computational Biology, BIOMAT.

AUG 2020 **Poster** at Virtual Annual Meeting of the Society for Mathematical Biology, SMB2020.

JAN 2020 **Participant** at Winter Workshop on Complex System, Charmey–CH.

JUL 2019 **Contributed talk** at Annual Meeting of the Society for Mathematical Biology, Montreal–CAN.

MAY 2019 **Poster** at Quantitative Aspects of Membrane Fusion and Fission, BPS Thematic Meeting, Padova–IT.

FEB 2019 **Poster** at Winter Workshop on Complex Systems, Zakopane–PL.

OCT 2018 **Poster** at Nanoscale mathematical modeling of synaptic transmission, calcium dynamics, transduction and cell sensing, Pisa–IT.

JUL 2018 **Contributed talk** and chair at Annual Meeting of the Society for Mathematical Biology and the Japanese Society for Mathematical Biology, Sydney–AU.

JUN 2018 **Participant** at Joint CAMBAM/NSERC-CREATE in Complex Dynamics Summer School, McGill University, Montreal–CAN.

FEB 2018 **Contributed talk** at Ninth Workshop Dynamical Systems Applied to Biology and Natural Sciences, DSABNS 2018, Torino – IT.

JAN-FEB 2017 **Contributed talk** at Eight Workshop Dynamical Systems Applied to Biology and Natural Sciences, DSABNS 2017, Évora – PT.

NOV 2016 **Contributed talk** at 1st International Workshop Franco-Italian Mathematical Ecology Days, Torino – IT.

JUL 2016 **Contributed talk** at 16th International Conference Computational and Mathematical Methods in Science and Engineering, CMMSE2016, Rota – ES.

JUN 2016 **Contributed talk** at International Conference on Mathematical Methods and Models in Biosciences and the School for Young Scientists, BIOMATH2016, Blagoevgrad–BU.

JAN 2016 **Participant** at School on Physics Applications in Biology, (ICTP South American Institute for Fundamental Research), San Paolo–BR.

JAN 2016 **Participant** at V Southern-Summer School on Mathematical Biology, (ICTP South American Institute for Fundamental Research), San Paolo–BR.

DEC 2015 Poster at **Welcome home**, Turin – IT.

SEP 2015 **Contributed talk** at 13th International Conference Of Numerical Analysis And Applied Mathematics, ICNAAM2015, Rhodes – GR.

SEP 2015 **Participant** at CAMo: from molecules to modelling, Turin – IT.

JUL 2015 **Contributed talk** at 15th International Conference Computational and Mathematical Methods in Science and Engineering, CMMSE2015, Rota – ES.

OCT 2014 **Participant** at Computational Harmonic Analysis - with Applications to Signal and Image Processing School, (CIRM), Marsiglia – FR.

JUN 2014 **Participant** at Strobl14: Modern time-frequency analysis, Strobl – AT.

## Organization of scientific meetings

SEP 2024 **Organizer** of conference Numerical Analysis and Modelling in Applied Sciences (NAMAS) Gaeta – IT.

APR 2023 **Organizer** of workshop PRIN 2022: Time-varying signals on graphs: real and complex methods – TIGRECO, Bergamo – IT.

OCT 2023 **Organizer** of conference Chiaccherate nonlineari, Alghero – IT.

NOV 2016 **Co-organizer** of 1st International Workshop Franco-Italian Mathematical Ecology Days, Turin – IT.

SEP 2015 **Co-organizer** of conference CAMo: from molecules to modeling, Turin – IT.

2014 **Co-organizer** Researchers' Night in Torino, an European level popularization of science event.

## Research funding

JUN 2023 PRIN 2022 research grant, as PI: Progetti di Rilevante Interesse Nazionale 2023-2025, 187.500 Euro

APR 2023 University grant (UNISS), as member: Interdisciplinary research projects, 2023-2025, 34.762,18 Euro

FEB 2023 INdAM–GNCS research grant, as member: INdAM–GNCS Project 2023, 2023-2024, 6.600 Euro

JAN 2023 Fondazione Sardegna research grant, as member: Progetti di ricerca di base dipartimentali, 2023–2024, 73.300 Euro

DEC 2021 IN$\delta$AM research grant, as PI: Finanziamento GNCS Giovani Ricercatori 2021–2022, 1.500 Euro

OCT 2020 IN$\delta$AM research grant, as PI: Finanziamento GNCS Giovani Ricercatori 2020–2021, 1.500 Euro

2020 RIL research grant, as PI: Ricerca di Interesse Locale 2020–2021, 958,87 Euro

2020 INdAM–GNCS research grant, as member: INdAM–GNCS Project 2020, 2020–2021, 6.400 Euro

JUL 2019–DEC 2021 Research grant: RTdA Attraction and International Mobility: AIM1852570–Num. Attività 1–Linea 1, Potenza–IT

MAR–JUL 2019 Research grant: Assegno di ricerca di tipo A, Padova–IT

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| OCT 2018 | IN$\delta$AM research grant, as PI: Finanziamento GNCS Giovani Ricercatori 2018–2019, 1200 Euro |
| MAR 2017–MAR 2019 | Research grant: Assegno di ricerca di tipo A, Padova–IT |
| OCT 2016 | IN$\delta$AM research grant: Finanziamento GNCS Giovani Ricercatori 2016–2017, 1200 euro |
| JUL–SEP 2016 | Erasmus Traineeship grant, University of Osnabrück, Germany |
| 2014–2017 | Three–year Ph.D scholarship sponsored by the University of Torino |

## Awards, prizes and grants

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|---|---|
| JUN 2021 | Team first classified (me as PI) to the PROPOSAL GAMIFICATION DAY of the workshop Think tank on Scientific Computing and funding opportunities, Camerino 18-19 June 2021. |
| 2020 | SNSF grant: Travel Grant 2020, 200 CHF |
| 2019 | SMB grant: Landahl-Busenberg Travel Grants 2019, 500 USD |
| JUL 2018 | SMB grant: Landahl Travel Grants 2018, 750 USD |
| JUN 2018 | Financial support to participate at 2018 Joint CAMBAM/NSERC-CREATE in Complex Dynamics Summer School, Montreal–CAN |
| JUN 2016 | Best Student Presentation Award at BIOMATH 2016 and the School for Young Scientists, Blagoevgrad–BU |
| JUN 2016 | SMB grant: SMB Financial Aid Grant BIOMATH 2016 |
| JAN 2016 | Financial support to participate at V Southern-Summer School on Mathematical Biology and School on Physics Applications in Biology, San Paolo–BR |
| 2008-2013 | Scholarship sponsored by Edisu |

## Research experience

First time I approached research was during my master studies at the University of Torino when from a project assigned to my team we published a paper in a high impact journal, Nonlinear Dynamics. In the first years of the doctoral program, I focused on a couple of different research topics, in analysis and applied mathematics. I finally decided to draft my thesis in mathematical biology. I have finished the degree with good and substantial scientific achievements. We have considered a few problems of common interest, and I have been quite responsive, really performing a very sizeable amount of work, leading to some interesting results. Two have been published in JMC, the others in Mathematics and Computers in Simulation, J of Biological Systems, Mathematical Methods in the Applied Sciences. I also published several other works, joint with other international coauthors. Overall, my research output to date amounts to twenty-eight published papers in international high-level journals, three book chapters and seven conference proceedings, who altogether received more than 210 citations (Scopus), significantly increased the last two year. In the past years, when in Torino, I was actively taken part in our weekly doctoral seminar, presenting my achievements on my research topics, and illustrating some relevant papers in the current literature. I would like to point out also that in the years elapsed from achieving the doctorate, I have already taken part in almost fifty international conferences, with active contributions in the most part of them and some invited contributions (twenty). I also have been awarded a few travel grants for taking part in these events and rewarded for the best student presentation at BIOMATH2016. I had the chance to be part of the organizing committee of three international events, among which two workshops, held in Turin.

I have demonstrated to be willing to travel to make new experiences already during the doctoral program, starting my PhD with a two months visiting at the Prof. H. G. Feichtinger lab (NuHAG). Notable is the one-month-long stay in Sao Paulo, Brazil, in January 2016, taking part in two international schools in modeling, where I could work in an interdisciplinary team of young researchers and later publish our result in J of Biological Systems. I have also visiting for two months, under the Erasmus program, the University of Osnabrück in the summer 2016, and establishing scientific ties there, as well as a number of other Institutions in the following years such as a six months visiting at EPFL (both in presence and smart-working) in Prof. Dimitri Van De Ville's lab. From the above cited experiences I learned how important interdisciplinary work is. I gained much from all these experiences and shown that I am willing to work hard to achieve my goals. One of the goals for my future career is to be able to lead an interdisciplinary research group.

In my PhD thesis, under the supervision of Prof. E. Venturino, I have mainly considered a number of problems in mathematical biology. The first part of the thesis is concerned with biological wastewater bioremediation using fungi. I formulated and studied the biodegradation of pollutants in water bodies. The second part of the dissertation considers problems in ecology, for interacting populations. An application concerns the disease caused by pathogenic fungi on an olive tree. All the models introduced are new. My contributions concern the mathematical assessment of the features of the models, equilibria and their stability and bifurcation diagrams. I also contributed in a decisive way to the formulation of the model for general interacting populations, behaving in herds. The quality of the thesis is good, and I have had an original idea in one of the models in consideration. My background is strong. Together with my supervisor we have further collaborated on a model for the use of fungi for water purification, in collaboration with biologists' colleagues in Torino, and later in a few other papers in mathematical ecology, some of them related on the populations' herd behavior.

In the postdoctoral experience, I have spent time at the University of Padua, in the Prof. MG. Pedersen's group, shifting my interests to a new field, on mathematical modeling of subcellular and cellular systems responsible for hormone secretion. I was quite quick in learning the biological and mathematical background needed for the modeling and analytical studies. In a few months I adapted and performed appropriate analysis of existing models with tools from dynamical systems theory, which provided the insight that allowed me to produce a modified, biophysically realistic model of beta-cells that behave much more like experimentally observed results. This work is published in Nonlinear Dynamics. Another project I worked on during my stay at University of Padua is about explaining the "burst-of-burst" phenomenon (Mixed-Mode Bursting Oscillations solutions) through the canard phenomenon. I have also worked on a bioengineering project, where I have analysed the main difference between bursting and spiking in terms of Ca2+ release. Further, I have continued the active participation in international conferences, also in the organizational aspects, especially the annual SMB meeting, where I have presented my own results. Exploiting these possibilities, I also developed a large number of international scientific collaborations.

I also had a Research Assistant Professor position in the University of Basilicata, in Potenza, on a specific research project, where I have started two new collaborations. One with the numeric group about reformulating a Partial Differential Equations metastatic tumor growth model in a Volterra Integral Equation of the second type and its numerical resolution. And a second one, with Sandra Saliani, we have been the first ones introducing the spectral graph wavelet packet on graphs for a single data point in the same fashion as for classical wavelet packet transform.

Now I have a tenure track position at the University of Sassari where I continue to collaborate with the colleagues from the previous institutions, but I have also gained my independence in choosing the research problems, on which work on and also my own network of collaborators/students. Overall, I am a person with whom it is easy to collaborate, highly active and responsive to needs that may arise. I am positive that I will be a good researcher, making good contributions in science in the future.

## Languages written and spoken

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|---|---|---|
| Romanian | Mother tongue | |
| Italian | Advanced | *self-assessed european level C2.* |
| English | Advanced | *self-assessed european level C1.* |
| French | Basic | *self-assessed european level A2.* |

## Other skills

- Use of mathematical software Matlab, Maple, Xppaut, Calc, Latex, Mathematica, GeoGebra, GiD.
- B italian driving licence, climbing, amateur dancing.