Curriculum Vitae (updated 20/05/2022)

Personal Information

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)**, *Dipartimento di Scienze Chimiche, Fisiche, Matematiche e Naturali, 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

Supervision

Undergraduate students:

2022	Martina Salvia, An epidemiological mathematical model assuming non well-mixed population, an application to Covid-19
2022-on going	Stefania Allegretti, Modeling oncolytic virotherapy

Scholarships:

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

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
Editorial board:	Mathematical Modelling and Numerical Simulation with Applications (MMNSA)
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, 2020-2023
Steering Committee	Member of the Steering Committee for Conference on Complex Systems, CCS, 2020-2023
Program Committee	International Conference on Complex Networks and their Applications 2021 and 2022
Program Committee	Conference on Complex Systems 2022 (CCS2022)

Teaching

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

2021–present	Member of Modellistica Socio-Epidemiologica, 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, 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-INδAM
2013–2015	Member of Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni, GNAMPA-INδAM

Mobility

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

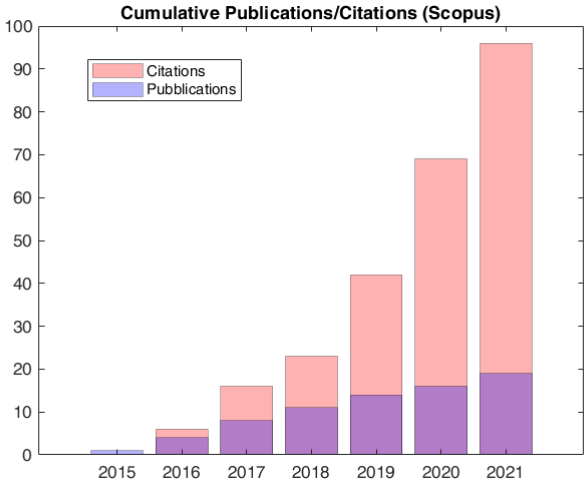
- Mathematical models applied to cancer; Ecoepidemiological mathematical models; Wastewater bioremediation;
- Spatiotemporal and Stochastic models for endocrine cells; Electrical activity and Ca^{+} dynamics in endocrine cells
- Slow/fast bifurcation analysis; excitation waves
- Graph signal processing applied to neuroimaging; Time-frequency analysis and applications

Major collaborations

M. G. Pedersen (Università di Padova), E. Venturino, F. Spina and G. C. Varese (Università di Torino), F. Montefusco (University of Sassari), F. Hilker (Osnabrück University), C. Berardo (University of Helsinki), P. Baptista and T. Gomes (Polytechnic Institute of Braganca), H. Laurie (University of Cape Town,), N. F. Britton (University of Bath), P. K. Tiwari (Kolkata University), A. K. Misra (Banaras Hindu University), V. H. Sanches (Universidade de Sao Paulo), Stéphanie Depickère (Universidad Mayor de San Andrés), T. Vo and R. Bertram (Florida State University), J. Tabak-Sznajder (University of Exeter), S. Saliani (Università della Basilicata), A.S. Teixeira (IU Network Science Institute, Indiana), E. Amico (EPFL).

Publications

Indicators related to scientific production: (updated on 14/03/2022)
-Total number of citations 102 (Scopus), 153 (Google scholar)
-H index 5 (Scopus), 7 (Google scholar)
-Publications 20 (Scopus), 31 (Google scholar)



Peer-reviewed journals

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

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

S4 I. M. Bulai, A. S. Teixeira, Modeling a rehab-recovery-relapse cycle with community dependence via ODEs. Under review.

S3 I. M. Bulai, S. Saliani, Spectral graph wavelet packets frames. Under review.

S2 I.M. Bulai, M.C De Bonis, C. Laurita, V. Sagaria, Modeling metastatic tumor evolution, numerical resolution and growth prediction. Under review.

S1 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. Under review.

WP8 I. M. Bulai, F. Montefusco, M.G. Pedersen, Nonlinear contagion modeling for epidemic dynamics.

WP7 F. Montefusco, A. Procopio, I.M. Bulai, F. Amato, M.G. Pedersen and C. Cosentino, Dancing with

COVID-19: How population behavior, feedback and memory shaped recurrent waves of the epidemic.

WP6 F. Montefusco, I. M. Bulai, New insights into the role of ultrasensitivity in biomolecular circuitry for achieving homeostasis.

WP5 I. M. Bulai, S. Allegretti A mathematical model for oncolytic vaccinia virus dynamics.

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, I Ferri, P Castioni, Modeling a coupled info-epidemic system for misinformation and virus spreading during the Covid-19 pandemic

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

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

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

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

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.

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

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

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

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

Research funding

DEC 2021 INδAM research grant: Finanziamento GNCS Giovani Ricercatori 2021–2022, 1500 Euro

OCT 2020 INδAM research grant: Finanziamento GNCS Giovani Ricercatori 2020–2021, 1500 Euro

2020 RIL 2020 : Research grant 958,87 Euro

2020 INdAM - GNCS Project 2020 : Research project grant (as member of RITA), 6400 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

OCT 2018 INδAM research grant: Finanziamento GNCS Giovani Ricercatori 2018–2019, 1200 Euro

MAR 2017–MAR 2019 Research grant: Assegno di ricerca di tipo A, Padova–IT

OCT 2016 INδAM 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

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

Languages written and spoken

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

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