Iulia Martina Bulai

https://iuliamartinabulai.github.io

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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

2017–Present **Post-Doc**, *Department of Information Engineering, University of Padova*, Department of excellence (2018 - 2022).

Supervisor Prof. Morten Gram Pedersen

Teaching and popularization experiences

2016/2017 Teaching assistant at Politecnico di Torino, Analysis 1.

2015/2016 Teaching assistant at Università degli Studi di Torino, Mathematics.

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

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 Researchers' Night in Torino, an European level popularization of science event.

Research areas of interest

- Spatiotemporal and Stochastic models for endocrine cells; Electrical activity and Ca^{+} dynamics in endocrine cells
- Mathematical modelling; Biological systems; Ecoepidemiological mathematical models; Wastewater bioremediation;
- Harmonic analysis, time-frequency analysis and applications to Schrödinger equations; Gabor frames and applications

Memberships of scientific societies

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

Major collaborations

M. G. Pedersen and F. Montefusco (UNIPD), E. Venturino, F. Spina and G. C. Varese (UNITO), F. Hilker (Osnabrück University), P. Baptista and T. Gomes (Polytechnic Institute of Braganca), H. Laurie (University of Cape Town,), P. K. Tiwari (Kolkata University), A. K. Misra (Banaras Hindu University);

Awards, prizes and grants

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

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

OCT 2016 INδAM grant: Finanziamento GNCS Giovani Ricercatori 2016–2017, 1200 euro

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

JUL-SEP 2016 Erasmus Traineeship grant, University of Osnabrück, Germany

JAN 2016 Financial support to participate at V Southern-Summer School on Mathematical Biology and School on Physics Applications in Biology, San Paolo–BR

2014-2017 Three-year Ph.D scholarship sponsored by the University of Torino

2008-2013 Scholarship sponsored by Edisu

Visiting position

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

Participation in schools and conferences

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.

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.

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

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

MAR 2015 Contributed talk at **Seminari dei dottorandi**, Turin – IT.

NOV 2014 Contributed talk at **Seminari dei dottorandi**, Turin – IT.

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.

Publications

Peer-reviewed journals

JP10 I. M. Bulai, M. G. Pedersen, Hopf bifurcation analysis of the fast subsystem of a polynomial phantom burster model. To appear in *Dolomites Research Notes on Approximation*, 2018.

JP9 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.

JP8 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.

JP7 I. M. Bulai, E. Venturino. Shape effects on herd behaviour in ecological interacting population models. *Mathematics and Computers in Simulation*, 2017.

JP6 I. M. Bulai, E. Venturino. Two mathematical models for dissolved oxygen in a lake. *Journal of Mathematical Chemistry*, 2017.

JP5 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).

JP4 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.

JP3 I. M. Bulai, E. Venturino. Biodegradation of organic pollutants in a water body. *Journal of Mathematical Chemistry*, 2016.

JP2 M. Berra, I. M. Bulai, E. Cordero and F. Nicola. Gabor Frames of Gaussian Beams for the Schrödinger equation. *Applied and Computational Harmonic Analysis*, 2015.

JP1 I. M. Bulai, R. Cavoretto, B. Chialva, D. Duma, E. Venturino. Comparing disease-control policies for interacting wild populations. *Nonlinear Dynamics*, 2014.

Book Chapters

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. *To appear in BIOMAT 2017 (series of books)*, 2017.

Conference proceedings

P5 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.

P4 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.

P3 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).

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.

Preprint submitted

PS5 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..Under revision.

PS4 P. K. Tiwari, I. M. Bulai, E. Venturino, A. K. Misra, Modelling the effect of human population on the fish survival in water bodies. Under revision.

PS3 I. M. Bulai, H. Laurie, E. Venturino, Herding induced by encounter rate, with predator pressure influencing prey response. Under revision.

PS2 I. M. Bulai, M. G. Pedersen, Stopping waves: Geometric analysis of coupled bursters in an asymmetric excitation field. Under revision.

PS1 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. Under revision.

Work in progress

- I. M. Bulai, M. G. Pedersen, Bursting versus spiking: Systematic investigation of how patterns of electrical activity control local Ca2+ and hormone release.
- I. M. Bulai, M. G. Pedersen, Biophysical model for stopping waves problem.
- I. M. Bulai, F. Hilker, Competing for resources in the presence of infection: Mathematical models of foraging interference and disease transmission.
- I. M. Bulai, F. Montefusco, Exploiting Ultrasensitivity for Biomolecular Implementation of a Error-Free Control System.
- I. M. Bulai, A. C. Esteves, E. Venturino, A mathematical model for an orange tree and the presence of a pathogen and beneficial fungus on it.
- I. M. Bulai, S. Jamaleddine and A. L. Jenner and F. Guichard, Functional responses, coupling strength, and phase dynamics of predator-prey systems

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.*

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

- Use of mathematical software GeoGebra, GiD, Maple, Matlab, Statistica, Xppaut, CalC, Latex.
- B italian driving licence, climbing.