Iulia Martina Bulai

Curriculum Vitae

Department of Information Engineering,
University of Padova
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Academic positions

Current

2017-Present **Post-Doc Research Fellow**, *Dipartimento di Ingegneria dell'Informazione, Padova*.

Supervisor Prof. Morten Gram Pedersen

Education

2017 **Ph.D. in Mathematics**, *Università degli Studi di Torino*.

Supervisor Prof. Ezio Venturino

2013 **Master of Science in Mathematics**, *Università degli Studi di Torino, Numerical analysis course*.

Supervisor Prof. Elena Cordero

2011 **Bachelor's degree in Mathematics**, *Università degli Studi di Torino*.

2008 **Scientific-Technologic High School Diploma**, *Liceo scientifico "N. Rosa"*, Bussoleno.

Research areas of interest

- *Electrical activity in endocrine cells*
- *Ecoepidemiological mathematical models*
- *Wastewater bioremediation*
- *Mathematical modelling*; *Biological systems*
- *Applied mathematics*
- *Multi-Resolution Algorithm for EFIE*
- *Harmonic analysis, time-frequency analysis and applications to Schrödinger equations*; *Gabor frames and applications*

Participation in research groups

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*.

Awards, prizes and grants

2016 **INδAM grant: "Finanziamento GNCS Giovani Ricercatori 2016"**, INδAM, Italy.

2016 **Best Student Presentation Award at the International Conference on Mathematical Methods and Models in Biosciences and the School for Young Scientists**, *19–25 June 2016*, Blagoevgrad–BU.

2016 **Erasmus Traineeship grant**, *29 July–30 September 2016*, University of Osnabrück, Germany.

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

2008-2013 **Scholarship sponsored by Edisu**.

Visiting position

- *Institute of Environmental Systems Research*, Osnabrück, January 2017.
- *Institute of Environmental Systems Research*, Osnabrück, August-September 2016.
- *Istituto Superiore Mario Boella (LACE)*, Torino, September-March 2014/2015.
- *Numerical Harmonic Analysis Group (NuHAG)*, Vienna, February-March 2014.

Participation in schools and conferences

- *2nd Workshop Franco-Italian Mathematical Ecology Days*, Torino – IT, May 2017.
- *Workshop DSABNS*, Évora – PT, January-February 2017.
- *Workshop Franco-Italian Mathematical Ecology Days*, Torino – IT, November 2016.
- *CMMSE2016: 16th International Conference Computational and Mathematical Methods in Science and Engineering*, Rota, Cadiz – ES, July 2016.
- *BIOMATH2016: International Conference on Mathematical Methods and Models in Biosciences and the School for Young Scientists*, Blagoevgrad–BU, 19–25 June, 2016.
- *School on Physics Applications in Biology*, San Paolo–BR, 11-29 January, 2016.
- *V Southern-Summer School on Mathematical Biology*, San Paolo–BR, 4–10 January, 2016.
- *ICNAAM2015: 13th International Conference Of Numerical Analysis And Applied Mathematics*, Rhodes – GR, September 2015.
- *CAMo: from molecules to modelling*, Turin – IT, September 2015.
- *CMMSE2015: 15th International Conference Computational and Mathematical Methods in Science and Engineering*, Rota, Cadiz – ES, July 2015.
- *CIRM: Computational Harmonic Analysis - with Applications to Signal and Image Processing* , Marsiglia – FR, October 2014.
- *Strobl14: Modern time-frequency analysis*, Strobl – AT, June 2014.

Presentations and posters

- *A mathematical model for an olive tree*, contributed talk at *DSABNS*, Évora – PT, January-February 2017.
- *A mathematical model for an olive tree*, contributed talk at *2nd Franco-Italian Mathematical Ecology Days*, Torino– IT, May 2017.

- *Shape effects on herd behaviour in two dimensional ecological interacting population models*, contributed talk at *Franco-Italian Mathematical Ecology Days*, Torino–IT, November 2016.
- *Competition between algae and fungi in a lake: a mathematical model*, contributed talk at *CMMSE2016*, Rota, Cadiz – ES, July 2016.
- *Wastewater bioremediation using white rot fungi: validation of a dynamical system*, contributed talk at *BIOMATH2016*, Blagoevgrad–BU June 2016.
- *Shape effects on herd behaviour in ecological interacting population models*, contributed talk at *Seminari dei dottorandi*, Torino – IT, March 2016.
- *Shape effects on herd behaviour in ecological interacting population models*, poster at *Welcome home*, Torino – IT, December 2015.
- *The Beddington-De Angelis and the HTII product response functions: application to polluted ecosystems biodegradation*, contributed talk at *ICNAAM2015*, Rhodes – GR, September 2015.
- *A mathematical model for the biodegradation of organic pollutants in a lake*, contributed talk at *CMMSE2015*, Rota, Cadiz – ES, July 2015.
- *An algorithm to find the MR basis and the grouping of the cells*, seminar at *Seminari dei dottorandi*, Torino – IT, November 2014.

Publications

Peer-reviewed journals

- 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.
- I. M. Bulai, E. Venturino. Shape effects on herd behaviour in ecological interacting population models. *Mathematics and Computers in Simulation*, 2017.
- I. M. Bulai, E. Venturino. Two mathematical models for dissolved oxygen in a lake. *Journal of Mathematical Chemistry*, 2017.
- 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).
- 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.
- I. M. Bulai, E. Venturino. Biodegradation of organic pollutants in a water body. *Journal of Mathematical Chemistry*, 2016.
- 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.
- I. M. Bulai, R. Cavoretto, B. Chialva, D. Duma, E. Venturino. Comparing disease-control policies for interacting wild populations. *Nonlinear Dynamics*, 2014.

Conference proceedings and volumes

- 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.
- 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.
- 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.
- 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).
- 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.
- 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

- I. M. Bulai, M. G. Pedersen, Stopping waves: Geometric analysis of coupled bursters in an asymmetric excitation field
- 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. *Preprint submitted*, 2017.
- P. K. Tiwari, I. M. Bulai, E. Venturino, A. K. Misra, Modelling the effect of human population on the fish survival in water bodies. *Preprint submitted*, 2016.

Work in progress

- I. M. Bulai, M. G. Pedersen, Analysis of phantom bursting model in the parameter space.
- I. M. Bulai, H. Laurie, E. Venturino, Changes in the shape of a population that lives in group and interact with an individualistic population.
- 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..
- I. M. Bulai, S. Depickère, V. Hirata, E. Vargas Bernal, Influence of asymptomatic malaria in malaria transmission: a mathematical model.
- 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, F. Hilker, A predator prey model with a disease in the predator population, the direct effect of the disease on the predator population and the indirect one on the prey population. Model in which the interference between predators is considered.

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.*

Teaching and popularization experiences

2016-2017 Teaching assistant at Politecnico di Torino, Analysis 1. September 2016-February 2017

2015-2016 Teaching assistant (Art.76). October 2015-February 2016

2014 Researchers' Night 2014, Collaborator to the activities of a stand at the *"Notte dei ricercatori" (researcher's night)* in Torino, an European level popularization of science event.

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

Organized conferences/ workshops

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

November 2016 Co-organizer of *Franco-Italian Mathematical Ecology Days*, Turin – IT.

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.*
Hungarian	Basic	*self-assessed european level A2.*

Other skills

- Programming in Visual Basic, C++.
- Use of mathematical software GeoGebra, GiD, Maple, Matlab, Statistica, Xppaut.
- B italian driving licence, climbing.