



Rossella Della Marca

Date of birth: 27/07/1993 | **Nationality:** Italian | **Gender:** Female |

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WORK POSITIONS

09/2021 – 08/2022

INdAM Postdoctoral fellow at University of Naples Federico II - Naples, Italy

Project: Sistemi dinamici per l'analisi delle interazioni tra epidemie e comportamenti individuali - **Funding:** Istituto Nazionale di Alta Matematica (INdAM)

01/2021 – 08/2021

Research fellow at Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna - Parma, Italy

Project: L'analisi delle reti per la valutazione del flusso di antibiotico resistenze tra i comparti zootecnico, urbano e ospedaliero - **Funding:** Italian Ministry of Health

EDUCATION AND TRAINING

11/2017 – 02/2021 – Parma, Italy

PHD IN MATHEMATICS – University of Parma, in convention with Universities of Ferrara and of Modena and Reggio Emilia

Thesis: Some challenging control problems in mathematical and behavioral epidemiology - **Supervisor:** prof. Groppi M - **Scientific Disciplinary Sector:** MAT/07 - Mathematical Physics - **Final grade:** Approved cum laude

EQF level 8

2015 – 2017 – Naples, Italy

MSC IN MATHEMATICS – University of Naples Federico II

Thesis: Optimal control of periodic epidemic models - **Advisor:** prof. Buonomo B - **Final grade:** 110/110 cum laude

EQF level 7

2012 – 2015 – Naples, Italy

BSC IN MATHEMATICS – University of Naples Federico II

Thesis: Archi in $PG(2,q)$ e calotte in $PG(3,q)$ - **Advisor:** prof. Durante N - **Final grade:** 110/110 cum laude

EQF level 6

LANGUAGE SKILLS

Mother tongue(s): ITALIAN

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
GERMAN	A2	A2	A2	A2	A2
ENGLISH	B2	B2	B2	B2	B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● VISITING PERIODS

01/03/2020 – 15/04/2020

Visiting PhD student at University of Minho - Guimarães, Portugal

Project: Mathematical models in ecology and epidemiology - **Local advisor:** prof. Soares AJ

14/02/2019 – 17/04/2019

Visiting PhD student at International Prevention Research Institute - Lyon, France

Project: Novel mathematical approaches to overcome current limitations of behavioural epidemiology of infectious diseases - **Local advisor:** dr. d'Onofrio A

● RESEARCH GRANTS

Fellowships

02/2020: Fellowship awarded by University of Modena and Reggio Emilia, to support my visiting period at University of Minho (Portugal)

01/2019: Fellowship awarded by Laboratory Ypatia of Mathematical Sciences (LYSM), to support my visiting period at International Prevention Research Institute (France)

Projects

02/2021 - 07/2022: Member of the project *Modelli cinetici per la trasmissione di malattie infettive tramite interazioni tra individui*, funded by [GNFM](#) (Gruppo Nazionale per la Fisica Matematica) of INdAM (Istituto Nazionale di Alta Matematica), 3 participants

● HONOURS AND AWARDS

05/06/2015

Faculty prize 2015 'Buon compleanno Federico II' to the most meritorious students - University of Naples Federico II

● SCIENTIFIC ACTIVITY

Papers

- Della Marca R, Loy N, Tosin A. An SIR-like kinetic model tracking individuals' viral load. (Submitted) [Preprint: [arXiv:2106.14480](https://arxiv.org/abs/2106.14480)]
- Buonomo B, Della Marca R, d'Onofrio A, Groppi M. A behavioural modelling approach to assess the impact of COVID-19 vaccine hesitancy. (Submitted) [Preprint: [arXiv:2106.11745](https://arxiv.org/abs/2106.11745)]
- Della Marca R, Machado Ramos MP, Ribeiro C, Soares AJ. Mathematical modelling of oscillating patterns for chronic autoimmune diseases. (Submitted)
- Bolzoni L, Della Marca R, Groppi M. On the optimal control of SIR model with Erlang-distributed infectious period: isolation strategies. *Journal of Mathematical Biology* 2021 (In press)
- Della Marca R, d'Onofrio A. [Volatile opinions and optimal control of vaccine awareness campaigns: chaotic behaviour of the forward-backward sweep algorithm vs. heuristic direct optimization](#). *Communications in Nonlinear Science and Numerical Simulation* 2021; 98:105768
- Buonomo B, Della Marca R. [Effects of information-induced behavioural changes during the COVID-19 lockdowns: the case of Italy](#). *Royal Society Open Science* 2020; 7:201635 [Preprint: [Modelling information-dependent social behaviors in response to lockdowns: the case of COVID-19 epidemic in Italy](#). medRxiv 2020.05.20.20107573]
- Bolzoni L, Della Marca R, Groppi M, Gagnani A. [Dynamics of a metapopulation epidemic model with localized culling](#). *Discrete & Continuous Dynamical Systems - B* 2020; 25(6):2307-2330
- Bolzoni L, Bonacini E, Della Marca R, Groppi M. [Optimal control of epidemic size and duration with limited resources](#). *Mathematical Biosciences* 2019; 315:108232
- Buonomo B, Della Marca R. [Oscillations and hysteresis in an epidemic model with information-dependent imperfect vaccination](#). *Mathematics and Computers in Simulation* 2019; 162:97-114
- Buonomo B, Della Marca R, d'Onofrio A. [Optimal public health intervention in a behavioural vaccination model: the interplay between seasonality, behaviour and latency period](#). *Mathematical Medicine and Biology: A Journal of the IMA* 2019; 36(3):297-324
- Groppi M, Della Marca R. [Modelli epidemiologici e vaccinazioni: da Bernoulli a oggi](#). *Matematica, Cultura e Società - Rivista dell'Unione Matematica Italiana* 2018; 3(1):45-59
- Buonomo B, Della Marca R. [Optimal bed net use for a dengue disease model with mosquito seasonal pattern](#). *Mathematical Methods in the Applied Sciences* 2018; 41(2):573-592

Seminars

- [Some challenging control problems in epidemic models](#) (Webinar) at MCMslot – Online Series of Seminars 2021, June 18, 2021
- [Dynamics and control of a behavioural vaccination model](#) (Webinar) at University of Minho, Braga (Portugal), July 24, 2020
- [Minimizing epidemic duration and size by using limited resources: an optimal control approach](#) (Webinar) at University of Aveiro (Portugal), May 29, 2020

Invited talks

- [Assessing the role of information on the adoption of COVID-19-protective tools](#) invited at minisymposium (by Soresina C and Zanella M) within the congress of the '[Italian Society of Applied and Industrial Mathematics](#)', September 3, 2021
- [Novel frameworks for optimal control problems in SIR epidemic models](#) invited at minisymposium (by Pugliese A and Venturino E) within the congress of the '[Italian Society of Applied and Industrial Mathematics](#)', August 30, 2021
- [Effects of information-induced behaviors during COVID-19 lockdown](#) at Online Workshop '[Stochastic Modeling on Complex Systems](#)', July 2, 2020
- [Dynamics and control of vaccine-preventable infectious diseases spread](#) at Electronic Workshop '[Collective Models, Control and Uncertainty Quantification for Infectious Diseases and Related Problems](#)', April 4, 2020

Contributed talks

- *Rapid vaccine opinion switching: optimal awareness campaigns via deterministic and heuristic algorithms* at 11th Workshop '[Dynamical Systems Applied to Biology and Natural Sciences](#)', Trento (Italy), February 6, 2020
- *Time-optimal vaccination strategies in SIR epidemic models* at XLIV Summer school on '[Mathematical Physics](#)', Ravello (Italy), September 4, 2019
- *The Boltzmann system for gas mixtures* at XLIII Summer school on '[Mathematical Physics](#)', Ravello (Italy), September 20, 2018
- *Optimal control of epidemic duration and size with limited resources* at 2nd Erice International Conference on '[Mathematical and Computational Epidemiology](#)', Erice (Italy), September 4, 2018
- *Time-optimal control of SIR epidemic models with limited resources* at CIME-EMS Summer School on '[The Mathematics of Mechanobiology](#)', Cetraro (Italy), August 29, 2018

Posters

- *Optimal public health intervention in a behavioural vaccination model under seasonally varying transmission* at 10th Workshop on '[Dynamical Systems Applied to Biology and Natural Sciences](#)', Naples (Italy), February 3-6, 2019
- *Optimal bed net use for a dengue disease model with mosquito seasonal pattern* at 9th Summer School on '[Methods and Models of Kinetic Theory](#)', Porto Ercole (Italy), June 10-16, 2018
- *Optimal bed net use for a dengue disease model with mosquito seasonal pattern* at 9th Workshop on '[Dynamical Systems Applied to Biology and Natural Sciences](#)', Turin (Italy), February 7-9, 2018

Conferences participation only

- One day meeting on '[Theory and Numerics in Kinetic Theory](#)', Parma (Italy), December 13, 2019
- Conference on '[Kinetic and Transport Equations: Mathematical Advances and Applications](#)', Parma (Italy), October 10-12, 2018

Schools attendance

- XLVI Summer School on '[Mathematical Physics](#)', Ravello (Italy), September 6-15, 2021
- Winter School on '[Reaction Diffusion PDE's and Optimization](#)', Brescia (Italy), January 13-15, 2020
- XLIV Summer School on '[Mathematical Physics](#)', Ravello (Italy), September 2-14, 2019
- Summer School on '[Data Science and Epidemic Models](#)', Trento (Italy), July 8-12, 2019
- Autumn School on '[From Interacting Particle Systems to Kinetic Equations: Modelling, Control, and Numerical Methods](#)', Verona (Italy), November 26-30, 2018
- XLIII Summer School on '[Mathematical Physics](#)', Ravello (Italy), September 10-22, 2018
- CIME-EMS Summer School on '[The Mathematics of Mechanobiology](#)', Cetraro (Italy), August 27-31, 2018
- 9th Summer School on '[Methods and Models of Kinetic Theory](#)', Porto Ercole (Italy), June 10-16, 2018

Scientific associations

- [GNFM](#) (Gruppo Nazionale per la Fisica Matematica) of INdAM (Istituto Nazionale di Alta Matematica) [2018 - Current]

Services

- Reviewer for: *Applied Mathematical Modelling*; *PLoS ONE*; *Communications in Nonlinear Science and Numerical Simulation*; *Journal of Theoretical Biology*; *Mathematics and Computers in Simulation*; *Journal of Applied Mathematics and Computing*; *Ricerche di Matematica*; *Advances in Difference Equations*; *Mathematical and Computer Modelling of Dynamical Systems*

● TEACHING AND MENTORING ACTIVITY

Integrated didactic

2018 - 2020: BSc in Chemistry, course 'Mathematics 1 and exercises', prof. Lorenzi LFG - University of Parma

Tutoring

2019 - 2020: BSc in Engineering - University of Parma

2018 - 2020: BSc in Chemistry - University of Parma

2018 - 2019: BSc in Biology; MSc in Biomolecular, Genomic and Cellular Sciences; MSc in Genomic, Molecular and Industrial Biotechnologies - University of Parma

2016 - 2017: BSc in Mathematics - University of Naples Federico II (student-to-student tutoring)

Co-advisory activity

BSc thesis in Mathematics

- *Modelli matematici per malattie trasmesse da vettore e applicazione al West Nile virus* (Alinovi A), University of Parma, December 17, 2020
- *Analisi di modelli epidemiologici con vaccinazione dipendente dalla scelta* (Ongari C), University of Parma, September 26, 2019
- *Analisi qualitativa di un modello SIS con esenzione razionale dalla vaccinazione* (Martani S), University of Parma, December 14, 2017

● DISSEMINATION ACTIVITY

Seminars

- *Matematica ed epidemie: il ruolo dei modelli* at Stage di Matematica e Informatica, University of Parma, June 7, 2021
- *Modelli matematici per le epidemie* at Campus di Matematica, Intelligenza Artificiale e Crittografia, University of Turin, May 10, 2021
- *Modelli matematici per le epidemie* at Stage di Matematica e Informatica, University of Parma, June 10, 2019

Books

- Della Marca R. [*La vaccinazione nei modelli epidemiologici: da Bernoulli a oggi - Con una prefazione di Paolo Linati*](#). Amazon Publishing 2020