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## Address:

Via San Pietro 1, 35010  
Vigonza (PD) - Italy

## Languages:

Italian (C2)  
English (C1, IELTS 7.5)

## Computer softwares:

$\LaTeX$   
Matlab  
Wolfram Mathematica  
Python  
Microsoft Office tools

# Mattia Sensi, Ph.D.

## Postdoctoral researcher at Inria

## About Me

My research interests are primarily mathematical biology and dynamical systems, and the main topic of my research at the moment is mathematical models of neural activity. My major expertise is the analysis of ODE systems evolving on multiple time scale, and mathematical epidemiology. I have worked on the analysis of PDE systems and on models of epidemics on networks. I am an advanced user of Matlab and  $\LaTeX$ , and a competent user of Wolfram Mathematica and Python.

## Research experience

### • Postdoctoral researcher in Mathematics

[MathNeuro](#), Inria Sophia Antipolis, Biot, France, December 2021 – present.  
Postdoctoral researcher in the group of [Prof. Mathieu Desroches](#).

### • Postdoctoral researcher in Mathematics

[NAS](#), TUDelft, Delft, The Netherlands, March 2021 – November 2021.  
Postdoctoral researcher in the project “Epidemics over Human Contact Graphs”, in the group of [Prof. Piet Van Mieghem](#).

## Education

### • Ph.D. in Mathematics, *cum laude*

Università degli Studi di Trento, Trento, Italy, 2017-2021.  
Title of the thesis: “*A Geometric Singular Perturbation approach to epidemic compartmental models*”, under the supervision of [Prof. Andrea Pugliese](#).

### • Master’s Degree in Mathematics

Universiteit van Amsterdam, Amsterdam, The Netherlands, 2015–2017.  
Title of the thesis: “*Homoclinic vegetation stripes in a Klausmeier-Gray-Scott model*”, under the supervision of [Prof. Dr. Arjen Doelman](#).

### • Bachelor’s Degree in Mathematics

Università degli Studi di Padova, Padova, Italy, 2011–2014.  
Title of the thesis: “*Portfolio optimization for quadratic utility function with partial information*”, under the supervision of [Prof. Wolfgang J. Runggaldier](#).

## Articles

- **H. Jardón-Kojakhmetov, C. Kuehn, A. Pugliese and M. Sensi.** [A geometric analysis of the SIR, SIRS and SIRWS epidemiological models](#). Nonlinear Analysis: Real World Applications, Volume 58, April 2021, 103220
- **H. Jardón-Kojakhmetov, C. Kuehn, A. Pugliese and M. Sensi.** [A geometric analysis of the SIRS epidemiological model on a homogeneous network](#). Journal of Mathematical Biology 83, 37 (2021)
- **T. Lorenzi, A. Pugliese, M. Sensi and A. Zardini.** [Evolutionary dynamics in an SI epidemic model with phenotype-structured susceptible compartment](#). Journal of Mathematical Biology 83, 72 (2021)
- **S. Ottaviano, M. Sensi and S. Sottile.** [Global stability of SAIRS epidemic models](#). Nonlinear Analysis: Real World Applications, Volume 65, June 2022, 103501
- **B. Chang, L. Yang, M. Sensi, M. A. Achterberg, F. Wang, M. Rinaldi and P. Van Mieghem.** [Markov Modulated Process to model human mobility](#). Complex Networks & Their Applications X. Studies in Computational Intelligence, vol 1015, Springer
- **S. Sottile, O. Kahramanogullari and M. Sensi.** [How network properties and epidemic parameters influence stochastic SIR dynamics on scale-free random networks](#). Journal of Simulation, Volume 16, Issue 4 (2022)
- **N. Cangiotti and M. Sensi.** [A geometric characterization of VES and Kadiyala-type production functions](#). Filomat, Volume 35, No 5 (2021)

- **N. Cangiotti and M. Sensi.** *Notes on a conformal characterization of 2-dimensional Lorentzian manifolds with constant Ricci scalar curvature.* U.P.B. Sci. Bull., Series A, Vol. 83, Iss. 2, 2021

## Preprints

- **P. Kaklamanos, C. Kuehn, N. Popovic and M. Sensi.** *Entry-exit functions in fast-slow systems with intersecting eigenvalues.* [Preprint on arXiv](#)
- **S. Ottaviano, M. Sensi and S. Sottile.** *Global stability of multi-group SAIRS epidemic models.* [Preprint on arXiv](#)
- **M. A. Achterberg and M. Sensi.** *A minimal model for adaptive SIS epidemics.* [Preprint on arXiv](#)
- **M. Aguiar, B. Kooi, A. Pugliese, M. Sensi and N. Stollenwerk.** *Time scale separation in the vector borne disease model SIRUV via center manifold analysis.* [Preprint on medRxiv](#)
- **N. Cangiotti, M. Capolli and M. Sensi.** *A Generalization of Lanchester's Model of Warfare.* [Preprint on arXiv](#)

## Teaching experience

- **At Inria – Université Côte d'Azur:**

Teacher of Mathematics for *Linear Algebra Bootcamp*, for first year students of Master's Degree in Computational Neuroscience, September – October 2022

- **At Università degli Studi di Trento:**

Assistant teacher for [Prof. Alberto Valli](#)'s course *Analisi 1*, for first year students of Bachelor's Degree in Civil, Environmental and Mechanical Engineering, September 2018 – February 2019, September 2020 – February 2021, September 2022 – December 2022

Tutor for [Prof. Andrea Pugliese](#)'s course *Probabilità e Statistica 2*, for second year students of Bachelor's Degree in Biotechnologies, February 2018 – May 2018

- **At Università Popolare Trentina (CFP-UPT):**

Teacher of Mathematics, October 2019 – June 2020

- **At Universiteit van Amsterdam:**

Assistant teacher for [Prof. Dr. Rob Stevenson](#)'s course *Numerieke Analyse*, for third year students of Bachelor's Degree in Mathematics, February 2017 – June 2017

Assistant teacher for [Dr. Han Peters](#)' course *Wiskunde 3*, for third year students of Bachelor's Degree in Physics, November 2015 – December 2015

## Other experiences

- **Private tutor**

Amsterdam and Utrecht, April 2016 – June 2017.  
Private tutor for [WisMon / Bèta onderwijsinstituut](#)

- **Freelance private teacher**

2008 – present. Freelance private teacher of Mathematics and Physics, for high-school and university students

## Mentoring

- **Master thesis**

Brian Chang, February 2021 – June 2021. [Modeling the Spread of Epidemics](#)

Liufei Yang, February 2021 – June 2021. [Developing a Markov-Modulated Process Model for Mobility Processes](#)

## Visiting periods

- **Visiting postdoc**

Trento, Italy, 5 – 8 December 2022. Visiting postdoc at University of Trento, working with [Prof. Andrea Pugliese](#) and [Sara Sottile](#)

- **Visiting postdoc**

Amsterdam and Groningen, the Netherlands, 21 – 25 November 2022. Visiting postdoc at VU Amsterdam and Rijksuniversiteit Groningen, working with [Prof. Bob Rink](#) and [Prof. Hildeberto Jardón-Kojakhmetov](#)

- **Visiting PhD student**

München, Germany, 15 April – 15 June 2019. Visiting PhD student at Technische Universität München (TUM), working with [Prof. Christian Kuehn](#) and [Dr. Hildeberto Jardón-Kojakhmetov](#)

## Communications

- **7 December 2022, invited speaker**

Seminar: [Mathematics Seminar](#), University of Trento  
Title: “*Delayed loss of stability in multiple time scale models of natural phenomena*”

- **23 November 2022, invited speaker**

Seminar: [Floris Takens Seminar](#), Rijksuniversiteit Groningen  
Title: “*Entry-exit functions in fast-slow systems with intersecting eigenvalues*”

- **21 November 2022, invited speaker**

Seminar: [Extra Dynamics Seminar](#), VU Amsterdam  
Title: “*A Geometric Singular Perturbation approach to epidemic compartmental models*”

- **14 October 2022, invited speaker**

Seminar: [Applied and Computational Mathematics](#), University of Edinburgh  
Title: “*Delayed loss of stability in multiple time scale models of natural phenomena*”

- **19–23 September 2022, minisymposium organizer and contributed speaker**

Conference: [ECMTB 2022](#), Heidelberg  
Title: “*A generalization of the full SNARE-SM model*”, part of the minisymposium “Recent advances in mathematical modelling in neuroscience”

- **17–22 July 2022, contributed speaker**

Conference: [ENOC 2022](#), Lyon  
Title: “*Delayed loss of stability in multiple time scale models of natural phenomena*”, part of the minisymposium “MS-05 Slow-Fast Systems and Phenomena”

- **23–27 May 2022, contributed speaker**

Conference: [100 UMI - 800 UniPD](#), Padova  
Title: “*A Geometric Singular Perturbation approach to epidemic compartmental models*”

- **22 April 2022 – present, organizer**

[MathNeuro seminars](#), cycle of seminars on mathematical models in neuroscience

- **11 March 2022, invited speaker**

Seminar: [Edinburgh Dynamical Systems Study Group](#), University of Edinburgh  
Title: “*Entry-exit functions: beyond eigenvalue separation*”

- **18 June 2021, invited speaker**

Seminar: [Edinburgh Dynamical Systems Study Group](#), University of Edinburgh  
Title: “*A Geometric Singular Perturbation approach to epidemic compartmental models*”

- **4–7 February 2020, organizer, scientific committee and contributed speaker**

Conference: [DSABNS 2020](#), Trento  
Title: “*A GSPT approach to epidemics on homogeneous graphs*”

- **12 September 2019, invited speaker**

Seminar: [Doc in Progress](#), Università degli Studi di Trento  
Title: “*An introduction to Geometric Singular Perturbation Theory*”

- **4–5 July 2019, contributed speaker**

Workshop: [Edinburgh Slow-Fast-Ival](#), Edinburgh  
Title: “*A GSPT approach to perturbed SIR and SIRWS models*”

- **3–6 February 2019, contributed speaker**

Conference: [DSABNS 2019](#), Naples  
Title: “*A GSPT approach to perturbed SIR and SIRWS models*”

- **21 January 2019, invited speaker**

Seminar: [Oberseminar Dynamics](#), TUM Munich  
Title: “*A GSPT approach to perturbed SIR and SIRWS models*”

## Reviewing

- **Journals**

[Journal of Mathematical Biology](#)  
[Advances in Difference Equations](#)  
[Mathematical Methods in the Applied Sciences](#)  
[Journal of Complex Networks](#)  
[Mathematical Biosciences and Engineering](#)  
[Journal of Biological Systems](#)  
[International Journal of Biomathematics](#)

## Attended Conferences & Workshops

- **30 June – 1 July 2022, selected participant**

Workshop: [NeuroMod Meeting 2022](#), Antibes

- **6–9 September 2021, selected participant**

Online workshop: [MoDiS – Modelling Diffusive Systems: Theory & Biological Applications](#), Edinburgh

- **12–15 April 2021, selected participant**

Online Hausdorff School: [Diffusive Systems](#), Bonn

- **1–8 September 2019, selected participant**

Summer school: [Mathematical Biology on the Mediterranean Conference](#), Samos

- **22–26 July 2019, selected participant**

Summer school: [Multiscale Phenomena in Geometry and Dynamics](#), München

- **8–11 October 2018, selected participant**

Workshop: [Mathematics for BioMedicine](#), Rome

- **19–26 August 2018, selected participant**

Summer school: [The Helsinki Summer School on Mathematical Ecology and Evolution 2018](#), Turku

## Membership

- **2017–2021, GNAMPA - INdAM**

Member of the group [Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni](#), of the [Istituto Nazionale di Alta Matematica](#)