CHIARA VILLA

Sorbonne Université ⋄ Postdoc ⋄ Mathematical Biology

Email	chiara.villa.1[at]sorbonne-universite.fr
Website	https://chiaravilla.github.io/website/index.html
Languages	Italian, English, French
Programming	MATLAB, Python, LaTeX, Fortran90, COMSOL, Maple, R, HTML5
Memberships	European Society for Mathematical and Theoretical Biology, Society for Mathematical Biology

ACADEMIC APPOINTMENTS

04/22 - today	**Postdoc**, *Laboratoire Jacques-Louis Lions, Sorbonne Université*, Paris (FR) Postdoctoral researcher in the group of Prof Benoît Perthame (ERC ADORA funding)

EDUCATION & RESEARCH EXPERIENCE

09/18 - 03/22	**PhD, Mathematics**, *University of St Andrews*, St Andrews (UK) Supervisors: Prof Mark Chaplain, Dr Tommaso Lorenzi Thesis title: 'Partial differential equation modelling in cancer and development'
2014 - 2018	**MMaths, Applied Mathematics**, *University of St Andrews*, St Andrews (UK) Fast Track, First Class Honours awarded.
Summer 2017	Undergraduate Summer Research Internship, *University of St Andrews*
Summer 2016	Complex Systems Biology Research Internship, *Università degli Studi di Torino*

RESEARCH INTERESTS AND PUBLICATIONS

I am an applied mathematician interested in mathematical models for the dynamics of living systems, with expertise in continuum, deterministic models describing the spatio-temporal dynamics of cell populations aimed at addressing open problems in cancer and development. These models comprise of systems of nonlinear, and often nonlocal, partial differential equations, which pose interesting analytical and numerical challenges, and may complement experimental research by providing a theoretical framework for *in silico* investigations.

Papers published in peer-reviewed journals

[1] C. Villa, M.A.J. Chaplain, T. Lorenzi, Modelling phenotypic heterogeneity in vascularised tumours, *SIAM Journal on Applied Mathematics*, 81, 434–453, 2021

[2] C. Villa, M.A.J. Chaplain, T. Lorenzi, Evolutionary dynamics in vascularised tumours under chemotherapy: Mathematical modelling, asymptotic analysis and numerical simulations, *Vietnam Journal of Mathematics*, 49, 143–167, 2021

[3] C. Villa, M.A.J. Chaplain, A. Gerisch, T. Lorenzi, Mechanical models of pattern and form in biological tissues: the role of stress-strain constitutive equations, *Bulletin of Mathematical Biology*, 83:80, 2021

[4] F. Mottes, C. Villa, M. Osella, M. Caselle, The impact of whole genome duplications on the human gene regulatory networks, *PLOS Computational Biology*, 17(12):e1009638, 2021

[5] C. Villa, A. Gerisch, M.A.J. Chaplain, A novel nonlocal partial differential equation model of endothelial progenitor cell cluster formation during the early stages of vasculogenesis, *Journal of Theoretical Biology*, 534(1):110963, 2022

Conference proceedings

[6] T. Lorenzi, F.R. Macfarlane, C. Villa, Discrete and continuum models for the evolutionary and spatial dynamics of cancer: a very short introduction through two case studies, (pp. 359-380) in *Trends in Biomathematics: Modeling Cells, Flows, Epidemics, and the Environment*, Ed. R. Mondaini, Springer, Cham, 2019

FUNDING, GRANTS AND PRIZES AWARDED

2022	**Junior Fellowship** for the participation to the workshop "Parabolic and kinetic models in population dynamics" in Toulouse in September 2022.
2022	**Paris Region Fellowship Programme** laureate (second call, start date in 01/2023) with a proposed project on "Mechanistic models of cell migration and cancer invasion: analysis, numerics, validation" (**€257760**).
2021	**IHP financial support** awarded by the Institute Henri Poincaré for the participation to the "Mathematical modeling of organization in living matter" thematic program in Paris during 10/01-01/04 2022 (**€4500**).
2020	**SMBdevBio Poster Prize 1** awarded by the Society for Mathematical Biology, Developmental Biology subgroup, at the online SMB2020 meeting (**$250**)
2020	**LMS ECR Travel Grant** awarded by the London Mathematical Society to attend the 12th European Conference on Mathematical and Theoretical Biology (**£500**)
2018	**PhD funding** awarded by the School of Mathematics and Statistics, UoStA (**£49124.25**)
2018	**The Principal's Scholarship for Academic Excellence**, prize awarded to the top 50 academically performing students in their final year at the UoStA(**£1000**)
2014 - 2018	**The Deans' list**, annual award for academic excellence by the Deans of the UoStA
2017	**Research scholarship** awarded by the UoStA to participate in the Undergraduate Summer Research Internship (**£1684.29**)

PROFESSIONAL RESPONSIBILITIES AND OUTREACH

**School of Mathematics and Statistics, University of St Andrews*

09/20 - today	**StAMBio seminar organiser***, Weekly talks by internal and guest speakers, online
03/21 - 04/21	**Journal Peer Reviewer**, *Frontiers in Ecology and Evolution* (Special issue: From Ecology to Cancer Biology and Back Again), *European Control Conference 2022*, *International Journal of Non-Linear Mechanics*, *Mathematical Biosciences* , *iScience*
11/20	**Piscopia Society***, PhD testimonial to encourage female/non-binary students who are considering a PhD in mathematics, promoting equality and diversity in STEM
01/20	**Postgraduate Interdisciplinary Mathematics Symposium organiser***,*Edzell*
09/18 - 09/19	**Postgraduate Research Rep & Postgraduate Research Executive Rep***
09/18 - 09/19	**University of St Andrews Student Rep**, *SMSTC*
11/18	**Outreach event***, Organiser and speaker at the event 'MT234 Research and Party'

MENTORING, TEACHING AND MARKING

All activities undertaken with the School of Mathematics and Statistics, University of St Andrews. Tutors and demonstrators work through exercise sheets with groups of 11 (tutors) or 50 (demonstrators) students each. All available student feedback data from tutorials is included and reported on a scale of 1 (excellent) to 5 (poor) in the categories of Explanation (E), Organisation (O) and Availability (A).

09/18 - 06/22	**Mentor in Peer Mentoring scheme** of 4 Undergraduate, 3 Master, 1 PhD students
Autumn 2020	**MT2000 Computing Workshop**, Demonstrator of computing in Python
Autumn 2019	**MT2000 Computing Workshop**, Demonstrator of computing in Python
Autumn 2019	**MT2501 Linear Mathematics**, Tutor of 2 groups (E=1.44, O=1.33, A=1.33)
Spring 2019	**MT2507 Mathematical Modelling**, Tutor of 2 groups (E=1.45, O=1.85, A=1.45), Demonstrator of 3 groups
Autumn 2018	**MT2503 Multivariate Calculus**, Tutor of 2 groups (E=1.17, O=1.5, A=1.17)
Autumn 2018	**MT2504 Combinatorics and Probability**, Marking of 100 computing projects
Autumn 2017	**UK Undergraduate Ambassadors Scheme**, weekly teaching assistance and activities with secondary school pupils (S1, S3, Advanced Higher Maths), UoSA module ID4001 - Communication and Teaching in Science, *Waid Academy, Anstruther (UK)*

SELECTED CONFERENCES, WORKSHOPS AND FORUMS

Selected meetings in which I presented my research in the form of a talk/poster (full list on my website)

May 2021	**Modelling cell and tissue biomechanics Workshop** *Sorbonne University (LJLL)*, Paris
Sep 2022	**12th European Conference for Mathematical and Theoretical Biology (Minisymposium invited speaker)** *ESMTB*, Heidelberg
Jun 2022	**Mathematical models for bio-medical sciences** Research school at Lake Como School of Advanced Studies, Como
Jan-Mar 2022	**Mathematical modeling of organization in living matter** Thematic trimester program at Institut Henri Poincaré (IHP), Paris
Jun 2021	**SoftMech Workshop** *University of St Andrews*, Online
May 2021	**Mathematical Biology on the Mediterranean Coast (Invited speaker)** *Sorbonne University (LJLL)*, Online
Apr 2021	**Mathematical Population Dynamics, Ecology and Evolution** *CIRM*, Online
Aug 2020	**Society for Mathematical Biology** Online conference, Awarded SMBdevBio Poster Prize 1
Jun 2020	**Interplay between Oncology, Mathematics and Numerics (Invited speaker)** *Sorbonne University (LJLL), Inserm, University of Poitiers*, Online conference
Dec 2019	**Scottish Mathematical Biology Forum (Invited speaker)** *Maxwell Institute for Mathematical Sciences*, Edinburgh
May 2019	**EMS Postgraduate Meeting** *Edinburgh Mathematical Society*, The Burn House, Edzell
May 2019	**Research School: PDEs in Mathematical Biology: Modelling and Analysis** *London Mathematical Society & Clay Mathematics Institute*, ICMS, Edinburgh
Apr 2019	**British Applied Mathematics Colloquium** *University of Bath*, Bath

Other workshops, conferences and yearly recurrent meetings attended.

Oct 2022	**Compsyscan22: A complex systems approach to cancer understanding** *BioSyL, IXXI, PLASCAN*, Lyon
Sep 2022	**Parabolic and kinetic models in population dynamics (Junior Fellowship)** *Institut de Mathématiques de Toulouse*, Toulouse
2021-2022	**Mathematics Challenges in Biology and Medicine** Workshop, *Politecnico di Torino*, Torino
2019-2021	**School of Mathematics and Statistics Research Day** *School of Mathematics and Statistics*, St Andrews (Online in 2021) *Society for Mathematical Biology & European Society for Mathematical and Theoretical Biology*, Postponed due to COVID-19, LMS ECR Travel Grant awarded
Nov 2019	**Modeling, analysis and simulation** – 50 years of Laboratoire Jacques-Louis Lions *Sorbonne University*, Paris
May 2019	**Computational Approaches in Mathematical Biology** Workshop, *University of Dundee*, Dundee