

CHIARA VILLA

Sorbonne Université ◊ Postdoc ◊ Mathematical Biology

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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, Société de Mathématiques Appliquées et Industrielles

ACADEMIC APPOINTMENTS

01/23 - today	PRFP postdoc , <i>Laboratoire Jacques-Louis Lions, Sorbonne Université</i> , Paris (FR) Laureate of the Paris Region Fellowship Programme (PR and EU MSCA funding) Project “Mechanistic modelling of cell migration and cancer invasion”
04/22 - 12/22	Postdoc , <i>Laboratoire Jacques-Louis Lions, Sorbonne Université</i> , Paris (FR) Postdoctoral researcher in the group of Prof Benoît Perthame (ERC ADORA funding)

EDUCATION & RESEARCH EXPERIENCE

09/18 - 03/22	PhD, Mathematics , <i>University of St Andrews</i> , 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 , <i>University of St Andrews</i> , St Andrews (UK) Fast Track, First Class Honours awarded.
Summer 2017	Undergraduate Summer Research Internship, <i>University of St Andrews</i>
Summer 2016	Complex Systems Biology Research Internship, <i>Università degli Studi di Torino</i>

FUNDING, GRANTS AND PRIZES AWARDED

2023	BOUM SMAI funding for the organisation to the workshop “Mathematical challenges in modelling cancer dynamics” in Paris in October 2023 (€1000).
2023	PEPS JCJC funding for the project “Conservative numerical schemes for novel structured PDE models of cancer invasion” in collaboration with Alexandre Poulain (€4900).
2023	UFR funding for the organisation to the workshop “Mathematical challenges in modelling cancer dynamics” in Paris in October 2023 (€1500).
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*

01/23 - today **Member of ‘Comité Parité’**, *Laboratoire Jacques-Louis Lions, Sorbonne Université*
 10/22 - today **Postdoctoral Research Rep**, *Laboratoire Jacques-Louis Lions, Sorbonne Université*
 03/21 - 12/22 **Journal Peer Reviewer**, *Bulletin of Mathematical Biology, iScience, Mathematical Biosciences, International Journal of Non-Linear Mechanics, European Control Conference 2022, Frontiers in Ecology and Evolution* (Special issue: From Ecology to Cancer Biology and Back Again)
 09/20 - 12/21 **StAMBio seminar organiser***, Weekly talks by internal and guest speakers, online
 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 of 2017-2022 undertaken with the School of Mathematics and Statistics, University of St Andrews. Teaching activities undertaken with groups of 50 (demonstrating) or 11 (tutoring) students. Feedback on Explanation (E), Organisation (O) and Availability (A) on a scale of 1 (excellent) to 5 (poor).

01/23 - today **Master thesis supervision** of Federica Padovano (EPFL), at LJLL (SU)
 09/18 - 06/22 **Mentor in Peer Mentoring scheme** of 4 Undergraduate, 3 Master, 2 PhD students
 Autumn 2020 **MT2000 Computing Workshop**, Demonstrator of computing in Python
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 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 SCIENTIFIC MEETINGS

Scientific meetings where I was invited to present my research (full list of meetings attended on my website)

Aug 2023 **SIMAI 2023**
 Minisymposium, *SIMAI*, Matera
 Jun 2023 **Mathematical Biology: Analysis and Application Workshop**
Technische Universität Dresden, Dresden
 May 2023 **The Evolution Seminar**
Bielefeld University (Evolutionary Biology group), Bielefeld
 Apr 2023 **Seminar ‘Analyse Numérique et Équations aux Dérivées Partielles’**
Université de Lille (Laboratoire Paul Painlevé), Lille
 Feb 2023 **Multiscale analysis and methods for PDEs Workshop**
Institute for Mathematical Sciences, Singapore
 Nov 2022 **Synthsys Seminar**
Centre for Synthetic and Systems Biology, Edinburgh

Oct 2022	Modelling cell and tissue biomechanics Workshop <i>Sorbonne University (LJLL), Paris</i>
Sep 2022	12th European Conference for Mathematical and Theoretical Biology Minisymposium, <i>ESMTB</i> , Heidelberg
Jun 2021	SoftMech Workshop <i>University of St Andrews, Online</i>
May 2021	Mathematical Biology on the Mediterranean Coast <i>Sorbonne University (LJLL), Online</i>
Jun 2020	Interplay between Oncology, Mathematics and Numerics <i>Sorbonne University (LJLL), Inserm, University of Poitiers, Online conference</i>
Dec 2019	Scottish Mathematical Biology Forum <i>Maxwell Institute for Mathematical Sciences, Edinburgh</i>

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.

Preprints

[1] L. Almeida, J.A. Denis, N. Ferrrand, T. Lorenzi, M. Sabbah, C. Villa, Evolutionary dynamics of glucose-deprived cancer cells: insights from experimentally-informed mathematical modelling, *ArXiv preprint arXiv:2301.08023*, 2023

Papers published in peer-reviewed journals

- [2] C. Villa, M.A.J. Chaplain, T. Lorenzi, Modelling phenotypic heterogeneity in vascularised tumours, *SIAM Journal on Applied Mathematics*, 81, 434–453, 2021
- [3] 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
- [4] 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
- [5] 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
- [6] 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

- [7] 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