Carles Falcó

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Education

University of Oxford, St. John's College — **Oxford, United Kingdom**
DPhil Mathematics, *Interactions and dynamics in collective cell behaviour* — *2021 – 2025*
Supervisors: Prof. Ruth E. Baker, Prof. José A. Carrillo

Universitat Autònoma de Barcelona — **Barcelona, Spain**
BSc Mathematics (GPA: 9.56/10) & BSc Physics (GPA: 9.50/10) — *2016 – 2021*

University of California, Santa Barbara — **Santa Barbara, California**
BSc Physics and Mathematics (GPA: 4.0/4.0) — *2018–2019*
Education Abroad Program (UCEAP)

Experience

Mathematical Institute, University of Oxford
Hooke Research Fellow — *Oct 2025 – present*
- Three-year independent research fellowship, part of the Wolfson Centre for Mathematical Biology.
- Co-organiser for the weekly WCMB seminar in mathematical and computational biology.

St Hugh's College, University of Oxford
Stipendiary Lecturer in Mathematics — *Oct 2022 – Sep 2025*
Tutorial teaching to second-year undergraduate students in a range of mathematical topics; assistance with undergraduate admissions interviews.

Journal articles

13. J. Kim, H. Jeong, **C. Falcó**, A. M. Hruska, A. Marzoratti, W. D. Martinson, M. Araiza, H. Yang, J. A. Carrillo, C. Franck, M. Guo, & I. Y. Wong, (2025). Collective transitions from orbiting to invasion in 3D multicellular spheroids are shaped by the matrix interface. To appear in *Nat. Phys.*

12. R. E. Baker, R. M. Crossley, **C. Falcó**[†] & S. F. Martina-Perez (2025). Modelling collective cell migration in a data-rich age: challenges and opportunities for data-driven modelling. To appear in *Cell Migration — Cold Spring Harbor Laboratory Perspectives in Biology.*

11. **C. Falcó** R. E. Baker & J. A. Carrillo (2025). A nonlocal-to-local approach to aggregation-diffusion equations. *SIAM Rev.*, 67, 353-372 (SIGEST).

10. **C. Falcó**, D. J. Cohen, J. A. Carrillo & R. E. Baker (2024). Quantifying cell cycle regulation by tissue crowding. *Biophys. J.*, 124, 923-932.

9. J. A. Carrillo, A. Esposito, **C. Falcó**[†] & A. Fernández-Jiménez (2024). Competing effects in fourth-order aggregation-diffusion equations. *Proc. London Math. Soc.*, 129, e12623.

8. **C. Falcó**, R. M. Crossley & R. E. Baker (2024). Travelling waves in a minimal go-or-grow model of cell invasion. *Appl. Math. Lett.*, 158, 109209.

7. **C. Falcó**, R. E. Baker & J. A. Carrillo (2024). A local continuum model of cell-cell adhesion. *SIAM J. Appl. Math.*, 84, S17-S42.

6. A. P. Browning, M. Tasca, **C. Falcó**, & R. E. Baker (2024). Structural identifiability for linear diffusion-advection-reaction processes in mathematical biology. *Proc. R. Soc. A*, 480:20230911.

5. **C. Falcó**, D. J. Cohen, J. A. Carrillo & R. E. Baker (2023). Quantifying tissue growth, shape and collision via continuum models and Bayesian inference. *J. R. Soc. Interface*, 20:20230184.

4. D. Buoso, **C. Falcó**[†], M. González & M. Miranda (2023). Bulk-boundary eigenvalues for bilaplacian problems. *Disc. Continuous Dyn. Syst. A*, 43, 1175-1200.

3. **C. Falcó** (2022). From random walks on networks to nonlinear diffusion. *Phys. Rev. E*, 106:054103.

2. **C. Falcó** & Á. Corral (2022). Finite-time scaling for epidemic processes with power-law superspreading events. *Phys. Rev. E*, 105:064122.

[†]authors listed alphabetically

1. **C. Falcó** & H. V. Moeller, (2022). Optimal spatial management in a multiuse marine habitat: Balancing fisheries and tourism. *Natural Resource Modeling*, 35, e12309.

Preprints

2. R. M. Crossley, **C. Falcó**, & R. E. Baker (2026). An optimal control approach to nonlinear wave speed selection in reaction-diffusion equations (submitted, arxiv preprint).
1. M. Pereira-Iglesias*, W. D. Martinson*, **C. Falcó***, J. Maldonado-Teixidó, ..., J. A. Carrillo, A. Sierra (2025). Epigenetic control of microglial developmental milestones from proliferative progenitors to efficient phagocytes (submitted, biorxiv preprint).

Mentoring

- Marjorie Watts, *Engineering Biology* CDT 11-week rotation project, co-supervision with Ruth Baker (Feb – May 2026).
- Belinda Huang, *Part C* dissertation.
- Jack Moylan, *MSc in Mathematical Sciences* Master's Thesis.
- Johannes Kristensen, *Mathematical and Theoretical Physics* Master's Thesis, co-supervision with Ruth Baker (Oct 2025 – ongoing).
- Marjorie Watts, *Mathematical Modelling and Scientific Computing* Master's Thesis, co-supervision with Giulia Celora (June – September 2025).
- Estelle McCool, *Healthcare Data Science* EPSRC CDT 10-week rotation project, co-supervision with Ruth Baker (March – June 2025).

Teaching

University of Oxford **Oxford, United Kingdom**

Mathematical Institute *2025*
- Lecturer for C5.12 Mathematical Physiology.
- Tutor for C5.4 Networks.

St Hugh's College, Stipendiary Lecturer in Mathematics *2022–2025*
- Taught tutorials to second-year undergraduate Mathematics students.
- Courses taught include: Special Relativity, Calculus of Variations, Mathematical Modelling in Biology, Quantum Theory, Metric Spaces and Complex Analysis, Integral Transforms, Differential Equations, Linear Algebra, Probability.
- Assisted with undergraduate admissions interviews.

St John's College & Wadham College *2022–2024*
- Tutor for ASO Mathematical Modelling in Biology.

Mathematical Institute *2021–2022*
- Teaching Assistant for B5.5 Further Mathematical Biology.
- Teaching Assistant for C5.4 Networks.

UC Santa Barbara **Santa Barbara, California**

Department of Physics *2019*
- Learning Assistant for Physics 1: Basic Physics, Classical Mechanics (Spring 2019).

Fellowships & Awards

Main awards

Reinhart-Heinrich Doctoral Thesis Award
European Society for Mathematical and Theoretical Biology *2025*

SIAM Student Paper Prize
Society for Industrial and Applied Mathematics *2025*
Awarded for the paper *A local continuum model of cell-cell adhesion* (SIAP, 2024).

Member of the EMS Young Academy
European Mathematical Society *2025-2028*

*equal contribution

SIGEST Award
Society for Industrial and Applied Mathematics *2024*
Awarded for the paper *A local continuum model of cell-cell adhesion* (SIAP, 2024), chosen on the basis of exceptional interest to the entire SIAM community.

North Senior Scholarship
St John's College, University of Oxford *2023-2024*
Awarded to four graduate students every year in all subjects, based on excellence in research.

Postgraduate Fellowships Abroad
Fundació "La Caixa" *2021-2023*
Funding for the two first years of my DPhil at Oxford including tuition fees and stipend.

Other

MATRIX Travel Grant
Mathematical Research Institute (MATRIX) *2026*
Travel funding to attend the *From Agent Based Models to Nonlinear PDEs in Life and Social Sciences* research programme, at MATRIX, Creswick, Australia.

NITMB Student Travel Award
National Institute for Theory and Mathematics in Biology *2025*
Travel grant to attend the NITMB MathBio Convergence Conference 2025.

ESMTB Travel Grant
European Society for Mathematical and Theoretical Biology *2024*
Travel grant to attend ECMTB 2024.

SIAM Student Travel Award
Society for Industrial and Applied Mathematics *2023*
Travel grant to attend SIAM DS23.

Landahl Award
Society for Mathematical Biology *2022*
Travel grant to attend SMB-ECMTB 2022.

Mathematical Institute Scholarship
Mathematical Institute, Oxford *2023-2025*
Four year funding offer including tuition fees and stipend.

Collaboration Fellowship for Spanish Undergraduates
Spanish Education Ministry *2020*
Funding for one academic year in the Physics UAB department working on my Physics Bachelor's thesis

Grant program Severo Ochoa – Introduction to Research 2020
ICMAT, Madrid (online) *2020*
Summer internship at ICMAT Madrid. Worked under the supervision of Prof. María del Mar González.

ISTernship program
IST Austria *2019*
Summer research internship at IST Austria. Worked under the supervision of Prof. Edouard Hannezo.

Research visits

- Research visit to Prof. Dagmar Iber at ETH Zurich, Feb 4, 2026.
- Research visit to Prof. Jennifer Flegg at University of Melbourne, Sep 9-13, 2024.
- Research visit to Prof. María del Mar González at Universidad Autónoma de Madrid - ICMAT, Mar 13-17, 2023.
- Research stay in the group of Prof. Jan Hasenauer at University of Bonn as part of the Programme: *Stochastic modelling in the life sciences: From evolution to medicine*, Jun 1 - Aug 10, 2022.

Talks and scientific presentations

- Contributed talk at BAMC, Norwich, 29 Mar - 1 Apr, 2026
- Talk at the workshop Multiscale Modelling in Biology, UCL, Mar 19, 2026.
- Talk at SoftBio Theory seminar, Rudolf Peierls Centre for Theoretical Physics, Oxford, Mar 9, 2026.
- Talk at the workshop From Micro to Macro in Mathematical Biology, Politecnico di Torino, Feb 9-11, 2026.

- Talk at the Junior Applied Mathematics Seminar, Mathematical Institute, Oxford, Nov 18, 2025.
- Poster at the Oxford-Japan Symposium on Cell Behaviors on Simple to Complex Environments, Oxford, Sep, 22-26, 2025.
- Poster at the NITMB MathBio Convergence Conference, Chicago, Aug 11-14, 2025.
- Talk at the workshop Mathematical Biology: Analysis and Applications, Warsaw, Jul 28-31, 2025.
- Talk at the workshop Mathematical modeling in biology and medicine, Wolfgang Pauli Institute Vienna, Jul 15-18, 2025.
- Online seminar by invitation at Physics of Life ECR-led seminar, Jun 10, 2025.
- Talk by invitation at minisymposium – BAMC, Exeter, Jun 23-26, 2025.
- Poster at the Qlife Quantitative Biology Spring School *Cell Dynamics in Developmental Systems*, Mar 31 - Apr 4, 2025.
- Flash talk & poster at the Barcelona Collaboratorium Annual Symposium: Modelling biology across scales, Barcelona, Oct 28-29, 2024.
- Talk by invitation at the MATRIX Workshop: Parameter Identifiability in Mathematical Biology, Creswick, Australia, Sep 20, 2024.
- Talk by invitation at the Melbourne Mathematical Biology seminar, Melbourne, Australia, Sep 10, 2024.
- Talk by invitation at the minisymposium – KSMB-SMB 24, Seoul, Jun 30 - Jul 5, 2024 (online due to injury).
- Talk by invitation at the conference: The Cahn-Hilliard equation - recent advances and new challenges, Chęciny, Apr 21-26, 2024.
- Seminar by invitation at Junior Analysis Seminar, Imperial College London, Oct 4, 2023.
- Talk by invitation at the workshop Measures and Representations of Interactions – Newton Institute Programme Mathematics of movement, Cambridge, Sep 11-15, 2023.
- Poster at the workshop Topics in Neuroscience, Collective Migration and Parameter Estimation, Oxford, July 3-7, 2023.
- Talk by invitation at minisymposium – SIAM DS23, Portland, May 14-18, 2023.
- Talk by invitation at minisymposium – BAMC, Bristol, Apr 3-5, 2023.
- Seminar by invitation at UAM-ICMAT PDE seminar, ICMAT, Madrid, Mar 16, 2023.
- Talk by invitation at minisymposium – SIAM CSE23, Amsterdam, Feb 26 - Mar 3, 2023.
- Online seminar by invitation at StAMBio seminar, University of St Andrews, Dec 5, 2022.
- Talk by invitation at minisymposium – SMB-ECMTB 2022, Universität Heidelberg, Sep 19-23, 2022.
- Lightning talk at SIAM Workshop on Network Science (NS22) (online), Sep 13-15, 2022.
- Contributed talk at BIFI International Conference: The science of COVID-19 (online), Jun 7-9, 2022.
- Poster at XXIII Congreso de Física Estadística, Universidad de Zaragoza, May 12-14, 2022.
- Talk at Young Researchers Workshop on PDEs and Probability, Univ. de Granada, May 3-6, 2022.
- Online seminar by invitation at Non-equilibrium systems group seminar, Imperial College London, Jan 14, 2022.

Reviewer for scientific journals

SIADS, PRE, PRR, JTB, BMB, JMB, JNS, Proc. R. Soc. Edinburgh. A, Physica A, R. Soc. Open Science, Stud. Appl. Math.

Outreach and media coverage

1. C. Falcó (2023). Matemáticas para explicar cómo se unen las células. Café y Teoremas, El País. [online access]
2. C. Falcó (2023). Quantifying tissue growth, shape, and collision in epithelial monolayers. SIAM News. [online access]