

## Potential Supervisors

### [Professor Helen Byrne](#)



After graduating from Cambridge University, I obtained a Masters degree in Mathematical Modelling and Numerical Analysis and then a DPhil in applied mathematics from Oxford University. Working as an MRC-funded postdoctoral researcher between Oxford and Hammersmith Hospital's Cyclotron Unit enabled me to transition into mathematical biology while gaining valuable experience of multidisciplinary research. I was awarded an EPSRC postdoctoral fellowship, but accepted a longer post to work on the same project, with Professor Mark Chaplain at the University of Bath, before taking up a lectureship in applied mathematics at UMIST (in Manchester). I moved to the University of Nottingham in 1998, won promotion to reader (2002) and professor (2003), and was awarded an EPSRC advanced fellowship to study interactions between growth and deformation in biological tissues (2000-2006). At the same time, I played an active role in establishing and developing Nottingham's Centre for Mathematical Medicine and Biology (Director, 1999-2011) while also co-organising the first series of Mathematics in Medicine Study Groups. In 2011, I returned to Oxford where I am a Professor of Mathematical Biology based in the Mathematical Institute.

My research continues to focus on the development and analysis of continuum and multiscale/hybrid models of biomedical systems, with particular interests in the growth and treatment of solid tumours, angiogenesis, stem cells and tissue engineering. I publish in a range of mathematical and biomedical journals. I receive regular invitations to give plenary lectures and have been a member of several international advisory boards (e.g., Isaac Newton Institute, Cambridge and the Centra de Recerca Matematica, Barcelona).

## Software Tools Developed

[Chaste](#) – Chaste (Cancer, Heart and Soft Tissue Environment) is a general purpose simulation package aimed at solving computationally demanding, multi-scale problems arising in biology and physiology. Current functionality includes tissue and cell level electrophysiology, discrete tissue modelling, and soft tissue modelling. The package is being developed by a team mainly based in the Computational Biology Group at the Department of Computer Science, University of Oxford, and development draws on expertise from software engineering, high performance computing, mathematical modelling and scientific computing.

[Microvessel Chaste](#) - A Chaste plug-in library for 3D spatial modelling of vascularized tissue, including discrete cells and vessels, PDE solvers, meshing and geometry tools.

## References

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  7. JA Grogan, AJ Connor, JM Pitt-Francis, PK Maini and HM Byrne (2018). The importance of geometry in the corneal micropocket angiogenesis assay. *PLoS Comp Biol* (in press)

## Supervision of DTC Students

[Joshua Bull](#) – SABS and Roche

[Anthony Connor](#) – SABS and Roche

[Sophie Kay](#) – SABS and AZ

[Sara-Jane Dunn](#) – LSI

[Gary Mirams](#)

## Collaborators

[Joe Pitt-Francis](#)

[James Grogan – post-doc](#)

[Philip Maini](#)

[Alex Fletcher](#) – post-doc

[Daniele Muraro – post-doc](#)

[James Osborne](#)