

LTCC Basic Course

Title: Mathematical Biology

Basic Details:

- Core Audience: 1st, 2nd and 3rd year app.
- Course Format: Extended: 5 x 2 hour lectures

Course Description:

The course aims to provide an introduction to multiscale methods in mathematical biology, including a survey of relevant applications. Emphasis is placed on how realistic biological effects at the microscale (e.g. gene expression within cells) can be captured in macroscopic models (e.g. PDEs for whole cell populations).

- Keywords: Mathematical biology, multiscale modelling
- Pre-requisites: Familiarity with applied ODEs and PDEs, and experience in coding or interest in learning to code. Some experience with asymptotic methods is useful but not required.
- Syllabus
 1. Random walkers/diffusion
 2. Asymptotic techniques (e.g. method of multiple scales)
 3. Age-structuring
 4. Networks
- Optional reading: *Random Walks in Biology*, H. Berg; *Mathematical Biology*, J.D. Murray; *Advanced Mathematical Methods for Scientists and Engineers I: Asymptotic Methods and Perturbation Theory*, C.M. Bender & S.A. Orszag

Format:

- 4 discussion/problem sheets with associated Python activities
- Electronic lecture notes

Lecturer Details:

Lecturer: Philip Pearce

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