

# SEMINÁRIO DE MECÂNICA

## An Introduction to Tumour Growth Modelling

Andrea Genovese de Oliveira

17/05/17

16:00 Horas

Auditório do MAT

**Abstract.** Cancer research has been generating a plethora of experimental data but tumour growth has only been studied mathematically since the beginning of the 20th Century. Specifically, multiphase fluid dynamic models have only recently (1990's) been used to understand the growth of tumours. Therefore, there is still a lot being developed in order to map the evolution of the tumour, especially in its later and more destructive stages. See, for example, leading researcher Prof. Dr. Helen Byrne, from the University of Oxford, in

[https://youtu.be/0uK\\_pHBD238](https://youtu.be/0uK_pHBD238)

In this first seminar, I will describe the biological background of tumour growth and explain the construction of two basic 1-D moving boundary models tracking the nutrient concentration within the tumour, the growth of the tumour, and, eventually, the internal composition of the tumour. This will lead us to a moving boundary problem with two moving boundaries. By studying these models, we will understand some of the key aspects of tumour growth modelling and how they relate to the biological properties observed in cancer patients.

This first seminar will only require a basic knowledge of PDE's, steady states, and linear stability, so I encourage all interested undergraduate students to attend. It will be delivered in Portuguese, with slides in English.

## Referências

- [1] N Britton. Essential mathematical biology. Springer Science & Business Media, 2012.
- [2] AC Burton. Rate of growth of solid tumours as a problem of diffusion. *Growth*, 30(2):157–176, 1966.
- [3] HP Greenspan. Models for the growth of a solid tumor by diffusion. *Studies in Applied Mathematics*, 51(4):317–340, 1972.
- [4] HP Greenspan. On the growth and stability of cell cultures and solid tumors. *Journal of theoretical biology*, 56(1):229–242, 1976.