



**Centro de Investigação em Matemática e Aplicações**  
**Programa de Doutoramento em Matemática**  
**Departamento de Matemática**

## **Seminário**

**22 de novembro de 2017 quarta-feira**  
**CLAV – Anfiteatro 1 - 15:15 horas**

### **Some modeling challenges on the physiopathology of the vascular system**

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### **Abstract**

Vascular diseases, such as brain aneurysms and atherosclerosis, are the main cause of death in the western countries. Such pathologies are not fully understood and lack precise diagnosis procedures. The mathematical modeling of blood flow in the cardiovascular system, both in normal and pathological conditions, may be the way to provide a computational tool to be used for diagnosis, prognosis or training purposes. In this sense, accurate numerical simulations must be achieved, in order to be considered reliable. However, this can be a challenge since important data, needed to close the mathematical model, is usually missing.

To overcome such difficulty, variational data assimilation techniques can be used. Besides, in the case of complex pathologies, such as atherosclerosis, a cascade of biochemical and biomechanical factors must be modeled. Therefore, such models result in coupled systems of partial differential equations, which are non-trivial from the analysis point of view. In this talk, we will discuss some mathematical and numerical aspects related to these issues.

*Apoio:*

**FCT**

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