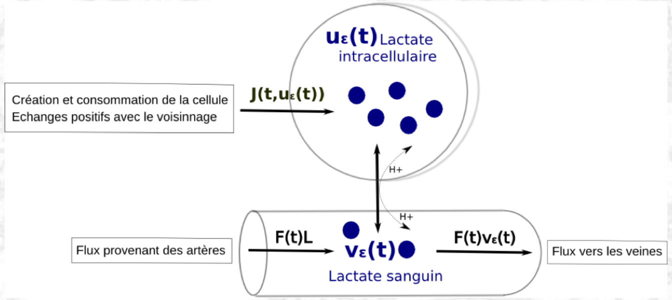
Università degli Studi di Pavia

Computational Mechanics & Advanced Materials Group - DICAr

SEMINAR

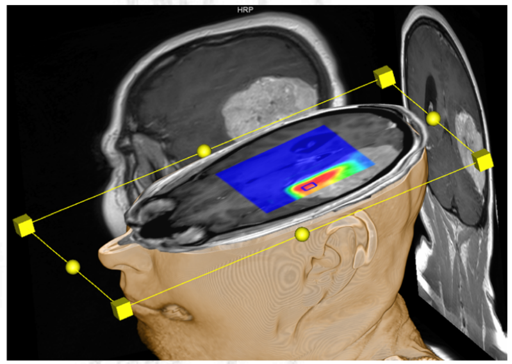
What can be deduced from MRI data?

In recent years, our understanding of the brain and behavior has been constantly increased. Thus today we have access to a lot of multimodal data. However it is still challenging to find an optimized way to interpret the results. Mathematics, and notablymathematical modeling, can be seen as a support or a tool to treat these data. I will present here some possibilities arising from the collaboration mathematics/MRI. In particular, I will describe a fast-slow system dealing with lactate kinetics on a local brain part, talking about its well-posedness and exhibiting bounds on the solutions. I will also give some simulations.



$$\underbrace{u_\varepsilon'(t)}_{\text{cell lactate variation}} = \underbrace{J(t,u_\varepsilon(t))}_{\text{cell consumption, exchanges with its neighborhood}} - \underbrace{T\left(\frac{u_\varepsilon(t)}{k+u_\varepsilon(t)} - \frac{v_\varepsilon(t)}{k'+v_\varepsilon(t)}\right)}_{\text{cell/blood exchange, symport law}}, \quad (1)$$

$$\underbrace{\varepsilon}_{\text{volume difference}} \times \underbrace{v_\varepsilon'(t)}_{\text{blood lactate variation}} = \underbrace{F(t)(L - v_\varepsilon(t))}_{\text{blood flow}} + \underbrace{T\left(\frac{u_\varepsilon(t)}{k+u_\varepsilon(t)} - \frac{v_\varepsilon(t)}{k'+v_\varepsilon(t)}\right)}_{\text{cell/blood exchange, symport law}}. \quad (2)$$



Eng. Angélique Perrillat, PhD Student

Poitiers University, France

May 7th, 2:00pm (sharp)

DICAr MS1 Meeting Room

Via Ferrata, 3 – Pavia