**Clément MARADEI**

Centre de recherche Inria (Paris) clement.maradei@inria.fr

***Modeling of diffusive and viscous waves :***

The wave equation arises in various fields including acoustics, fluid dynamics and electromagnetism. In certain contexts, it is sufficient to accurately describe real life phenomena. However, some fields are more demanding in terms of modeling. This is the case for seismology, in particular in the propagation of waves in non elastic media, which induces damping. In order to properly capture the behavior of such waves, we investigate a new model with two additional terms. The first is a conventional (first order time derivative) damping term, while the second introduces a viscous damping effect and is mathematically represented by the time derivative of the Laplacian. We investigate the relative contributions of both terms. The numerical results are obtained using a finite element discretization in space and an implicit finite difference method in time. To take into account the non-bounded physical domain, non-reflective Perfectly Matched Layers (PMLs) were incorporated. FreeFem++ offered an effective framework that simplified the technical difficulties associated with implementing the model.

Joint work with Michel Kern at Inria Paris (Serena team).