

**Speaker: Aeljandro Gárriz**

Title: *Precise travelling-wave behaviour in problems with doubly nonlinear diffusion*

Abstract:

We study a family of reaction-diffusion equations of the form  $u_t = \Delta_p u^m + h(u)$  for  $x \in \mathbb{R}^N$ . The reaction term  $h(u)$  is rather general, covering in particular monostable, bistable and combustion type nonlinearities. We consider the so-called slow diffusion regime, which leads to finite speed of propagation.

This family of equations have a unique (up to translations) travelling wave with a finite front. When the initial datum is compactly supported and the solution converges to 1, in the radially symmetric case, we prove that the solution converges to a translation of this unique travelling wave in the radial direction, with a precise logarithmic correction in the position of the free boundary when the dimension  $N \geq 2$ ; and in the non-radial case, we obtain the asymptotic location of the free boundary and level sets up to an error term of size  $O(1)$ . Most of our results are new also for the special cases  $p = 2$  (porous medium diffusion) and  $m = 1$  (p-Laplacian diffusion).