

# **Porous Medium Flow with both a Fractional Potential Pressure and Fractional Time Derivative**

MARK ALLEN

University of Texas at Austin, USA

In this talk we will discuss a model for porous medium flow. The operator has nonlocal diffusion effects given by an inverse fractional Laplacian operator. The derivative in time is also fractional of Caputo-type and which takes into account "memory". We prove existence for weak solutions when the initial data has exponential decay at infinity. Our main result is Hölder continuity for such weak solutions. This is joint work with L. Caffarelli and A. Vasseur.