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**Seminar of the Department of Mathematics and Statistics, University of Cyprus**

Room: 037, ΣΘΕΕ01. Date: 10/05/2017 Time: 11:00

**Speaker :** Emmanouil Milakis (University of Cyprus)

**Title :** Parabolic Obstacle Problems. Theory and Applications

**Abstract:**

Obstacle problems are characterised by the fact that the solution must satisfy unilateral constraint i.e. must remain, on its domain of definition or part of it, above a given function the so called obstacle. Parabolic obstacle problems, i.e. when the involved operators are of parabolic type, can be formulated in various ways such as a system of inequalities, variational inequalities or Hamilton- Jacobi equation. In the first part of the talk, I will briefly explain the formulation of elliptic and parabolic obstacle problems and will connect them with the corresponding extension problems for the fractional Laplacian and fractional Ηeat. In the second part of the talk, I will present some of our recent results on the so-called  non-dynamic parabolic Fractional Obstacle Problem. We will discuss how to obtain higher regularity as well as optimal regularity of the space derivatives of the solution. Furthermore, at free boundary points of positive parabolic density, I will describe how the Holder continuity of the time derivative is obtained. Based on joint works with I. Athanasopoulos (University of Crete) and L. Caffarelli (University of Texas-Austin).