

RAINWATER SEMINAR

The singular free boundary in the Signorini problem

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C-401

1:30-3:30

The study of the classical obstacle problem began in the 60's with the pioneering works of G. Stampacchia, H. Lewy and J. L. Lions. During the past five decades it has led to beautiful and deep developments in calculus of variations and geometric partial differential equations. One of its crowning achievements has been the development, due to L. Caffarelli, of the theory of free boundaries. Nowadays the obstacle problem continues to offer many challenges and its study is as active as ever. In particular, over the past years there has been some interesting progress in the thin obstacle problem, also called Signorini problem.

In the first part of the talk I will overview the Signorini problem for the Laplacian, and I will describe a few methods used to tackle two fundamental questions: what is the optimal regularity of the solution, and what is the regularity of the free boundary.

In the second part of the talk I will analyze the singular set in the Signorini problem for a divergence form elliptic operator with Lipschitz coefficients, in the case of zero thin obstacle. The proofs are based on Weiss and Monneau type monotonicity formulas.

This is joint work with Nicola Garofalo and Arshak Petrosyan.