1139-35-95 **Thomas Backing** and **Donatella Danielli*** (danielli@math.purdue.edu), Department of Mathematics, 150 N University St, West Lafayette, IN 47907, and **Rohit Jain**. *Regularity Results for a Penalized Boundary Obstacle Problem.*

In this talk we will discuss a two-penalty boundary obstacle problem of interest in thermics and fluid dynamics. Specifically, our goal is to establish existence, uniqueness and optimal regularity of the solutions, as well as structural properties of the free boundary. The study hinges on the monotone character of a perturbed frequency function of Almgren's type, and the analysis of the associated blow-ups. (Received February 02, 2018)