

**Speaker:** Mariana Smit Vega Gracia  
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Tuesday, September 10, 2013  
11:00 pm  
Room: 258 Hurley Hall

**Title:** The thin obstacle problem: new monotonicity formulas and optimal regularity

**Abstract:**

We will describe the lower-dimensional obstacle problem for a uniformly elliptic, divergence form operator  $L = \operatorname{div}(A(x)\nabla)$  with Lipschitz continuous coefficients and discuss the optimal regularity of the solution. Our main result states that, similarly to what happens when  $L = \Delta$ , the variational solution has the optimal interior regularity  $C_{loc}^{1, \frac{1}{2}}(\Omega_{\pm} \cup \mathcal{M})$ , where  $\mathcal{M}$  is a codimension one flat manifold which supports the obstacle and divides the domain  $\Omega$  into two parts,  $\Omega_+$  and  $\Omega_-$ . We achieve this by proving some new monotonicity formulas for an appropriate generalization of the celebrated Almgren's frequency functional. This is joint work with Nicola Garofalo.