1095-35-66 **Mariana Smit Vega Garcia*** (msmitveg@math.purdue.edu), msmitveg@math.purdue.edu, and **Nicola Garofalo**. *Optimal regularity in the Signorini problem with variable coefficients and new monotonicity formulas.*

We will start by describing the interior Signorini, or lower-dimensional obstacle problem, for a uniformly elliptic divergence form operator $L = \mathrm{div}(A(x)\nabla)$ 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 $C^{1,\frac{1}{2}}_{loc}(\Omega_\pm \cup \mathcal{M})$, where $\mathcal{M}$ is a codimension one flat manifold which supports the obstacle and divides the domain Ω into two parts, Ω_+ and Ω_-. We achieve this by proving some new monotonicity formulas for an appropriate generalization of the celebrated Almgren's frequency functional. (Received August 27, 2013)