Abstract. Minimal surfaces, i.e. surfaces whose mean curvature vanishes identically, are the classical model used to describe soap films hanging on a wire. The zero mean curvature condition can easily be derived by enforcing the balance of the pressure forces acting on the two sides of the film with the Laplace pressure induced by surface tension, under the critical assumption that gravity effects on the geometry of the resulting surface are negligible. As demonstrated by experiments, this model fails to be accurate when the characteristic length scale of the film is large. In these cases, the film is in fact an almost-minimal surface, that is a surface with small (but non-zero) mean curvature. In this talk, I will tackle the following problem: is the theory of minimal surfaces spanning a given boundary wire powerful enough to describe all possible limits of almost-minimal surfaces as the mean curvature of the latter approaches zero? I will discuss the problem both from a qualitative and quantitative point of view, providing sufficient conditions on the boundary wire under which the answer is positive.

This is joint work with Francesco Maggi (University of Texas at Austin) and Antonello Scardicchio (International Centre for Theoretical Physics, Trieste, Italy).

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