



# 6th Symposium on Analysis and PDEs

Purdue University, June 1–4, 2015

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*3 lectures: June 2–4, 9:00–9:50am.*

**MINICOURSE: *Free Boundaries and Minimal Surfaces.***

Free boundaries arise as the interface between materials in which the materials retain some energy. In contrast, the interface represented by a minimal surface lives in an ambient space that is empty. Despite this difference between these two types of interfaces, there are deep connections between them. In a ground-breaking paper in 1980, Alt and Caffarelli showed that strategies and tools from the theory of minimal surfaces yield fundamental regularity theorems for free boundaries. The field has exploded since then.

In these lectures, we will start by explaining the wide family of energy functionals that can be treated by free boundary methods developed in that last 35 years. We will then focus on recent progress describing minimizers in higher dimensions and higher critical points in dimension 2. These are contexts in which free boundary problems return the favor by pointing to new insights into minimal surfaces.