1125-11-12   **Richard Taylor***, Institute for Advanced Study, Princeton, NJ 08540. *Galois groups and locally symmetric spaces.*

Langlands proposed an extraordinary correspondence between representations of Galois groups and automorphic forms, which has deep, and completely unexpected, implications for the study of both objects. The simplest special case is Gauss' law of quadratic reciprocity. In the so called 'regular, self-dual' case much progress has been made in the roughly 40 years since Langlands made these conjectures. In this talk I will discuss recent progress in regular, but non-self-dual case. In this case the automorphic forms in question can be realized as cohomology classes for arithmetic locally symmetric spaces, i.e quotients of symmetric spaces by discrete groups. Thus instead of the Langlands correspondence being a relationship between algebra and analysis, it can be thought of as a relationship between algebra and topology. This realization of the Langlands correspondence is in many ways more concrete. It also admits to generalizations not envisioned by Langlands, for instance relating mod p Galois representations with mod p cohomology classes. In this talk I will describe the expected Langlands correspondence in the setting of locally symmetric spaces. I will try both to present the general picture and to give numerical examples. I will also describe recent theorems of Lan, Harris, Thorne and myself on the Langlands correspondence in this setting and startling progress of Peter Scholze in the mod p case. I will not attempt to describe the proofs.