Abstract:

About 30 years ago Drinfeld introduced his p-adic symmetric domain of dimension $d$, denoted here $X$, which is an analytic space over the field of p-adic numbers, on which

$$G = GL_{d+1}(Q_p)$$

acts. Its quotients $X_\Gamma$ by discrete and cocompact subgroups $\Gamma \subset G$ are (the analytic spaces associated to) smooth projective varieties. Among these $p$-adically uniformized varieties lie some important Shimura varieties.

There is a "reduction" map from $X$ to $T$, the Bruhat-Tits building of $G$. Using it, harmonic analysis on $T$, and ideas coming from the combinatorics of hyperplane arrangements, we describe the cohomology of $X$ and of $X_\Gamma$ in terms of harmonic cochains on $T$ (extending work begun by Schneider and Stuhler in 1991). Applications to the cohomology of $X_\Gamma$, include a Hodge-like decomposition of the cohomology, and a proof of the Monodromy-Weight conjecture for this class of varieties.

In most of the talk, we shall only assume standard background in algebraic geometry and familiarity with the $p$-adic numbers. All of the concepts mentioned above will be defined!