Iwahori Spherical Whittaker Functions

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For an unramified principal series representation of $GL_n(\mathbb{Q}_p)$, the well-known Casselman-Shalika formula expresses the value of the K-spherical Whittaker function, where $K = GL_n(\mathbb{Z}_p)$. In this talk we will demonstrate how to obtain a similar formula for Iwahori spherical Whittaker functions by using the action of the Iwahori Hecke algebra $\mathcal{H}(GL_n(\mathbb{Q}_p), J)$ and discuss how these functions emerge from Steinberg representations π_{St} of $GL_n(\mathbb{Q}_p)$. In more detail, let J denote the Iwahori subgroup of $GL_n(\mathbb{Q}_p)$. For ψ an unramified additive character of the upper-triangular unipotent subgroup N consider the Whittaker model of π_{St} denoted by $\mathbf{W}(\pi_{St}, \psi)$. We compute the unique (up to scalar multiple) function inside $\mathbf{W}(\pi_{St}, \psi)^J$ and use it to show that π_{St} contains a newform i.e. a vector stabilized by J but no larger parahoric. This talk is based on joint work with prof. E.M. Baruch.