SPEAKER: Joel Bellaiche

TITLE: Critical p-adic L-functions

ABSTRACT: In the seventies, works of Mazur-Swinnerton-Dyer, Manin, Amice-Velu and Vishik showed that it was possible to attach a p- adic L-function to a cuspidal eigenform of weight $k \geq 2$. There was a restriction, still: the modular form had to be "of non-critical slope". A few years ago, Pollack and Stevens were able to define the missing p-adic L-functions in some "critical-slope" cases, namely for the cuspidal eigenforms that were of "critical-slope" but not "critical". In this talk I will explain how one can, using our knowledge of the geometry of the eigencurve, extend their work to construct a p-adic L-function for all modular eigenforms, critical or not. We will show that the p-adic L-functions, old and new, fit into a two-variables p-adic L- function on the eigencurve, extending earlier results of Stevens, Panchishkin and Emerton, and that many of the new p-adic L- functions satisfy Iwasawa's main conjecture (as formulated, in this non-ordinary case, by Perrin-Riou and Pottharst).

In the first part of the talk I will recall the proof of the construction of the p-adic L-function in the non-critical slope case, using Stevens' beautiful and simple reformulation in terms of "overconvergent modular symbols". The RTG talk will be an introduction to modular symbols and to their relations with modular forms.