Brandeis University

Everytopic Seminar

**Friday, November 20**

in room 226 at 2:10pm

Be careful: unusual time!

# Iwasawa theory of non-ordinary modular forms

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In the 1960's, Iwasawa made a systematic study of the p-part of class numbers in certain towers of number fields, and observed shocking regularity in the growth of these numbers. These observations were very surprising since class numbers are often thought to behave in a very erratic manner.

In the 1970's, Mazur adapted Iwasawa's ideas to the study of Tate-Shafarevich groups of elliptic curves with ordinary reduction, and this theory has since been generalized to arbitrary weight ordinary modular forms. The structure of Mazur's theory matches well with Iwasawa's theory save for the fact that many of Iwasawa's theorems remain to this day as conjectures in the context of elliptic curves.

In this talk, after discussing the classical case of class numbers, and Mazur's work with ordinary elliptic curves, I will discuss the non-ordinary case which has remained quite elusive. After reviewing what is known in weight 2, I will discuss how one can use recent results on $p$-adic local Langlands to describe (at least conjecturally) the Iwasawa theory of arbitary weight non-ordinary modular forms.