2010-2011 Distinguished Lecture Series

UCLA Department of Mathematics

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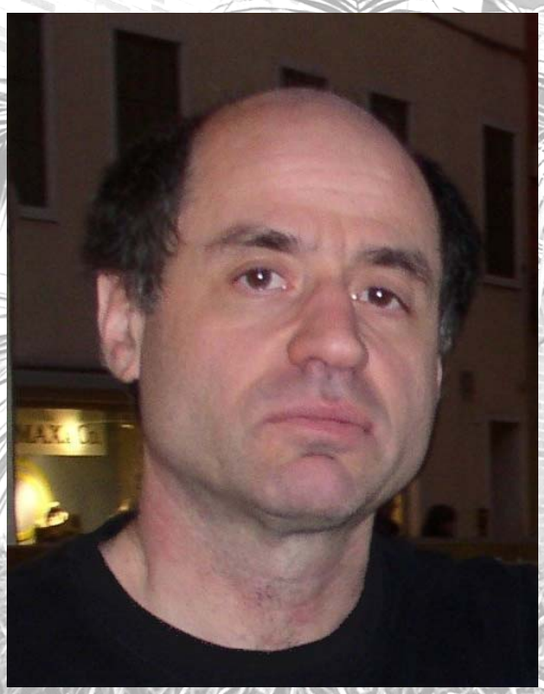
Institut de Mathématiques de Jussieu

Applications of the fundamental lemma to number theory

Abstract: **The *Fundamental Lemma*, proved by Ngô Bao Châu in 2007-2008, is an explicit identity between integrals over conjugacy classes of functions on certain pairs of *p*-adic groups. It was formulated as a conjecture by Langlands and Shelstad in 1987, with two primary motivations: to stabilize the Arthur-Selberg trace formula, in order to establish certain cases of Langlands' functoriality conjectures, and to determine the representations of Galois groups of number fields arising from the cohomology of Shimura varieties. Thanks to the work of Ngô and related results of Arthur, Kottwitz, Waldspurger, Laumon, and many others, a great deal of progress has been made on both of these questions.**

The lecture will be in two parts. The first part will describe the Galois representations that have been constructed with the help of the Fundamental Lemma and will show how knowledge of their existence, combined with the methods introduced by Wiles, can be applied to solve traditional problems in algebraic number theory, such as the Sato-Tate conjecture and the Main Conjectures in Iwasawa theory. The second part will explain how the fundamental lemma arises in the theory of the stable trace formula.



Lecture 1
Wednesday, November 10
2:00 - 2:45 pm
MS 6627

Lecture 2
Wednesday, November 10
3:00 - 3:45 pm
MS 5233

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