COLUMBIA UNIVERSITY

Department of Mathematics

SAMUEL EILENBERG LECTURES

FALL 2011

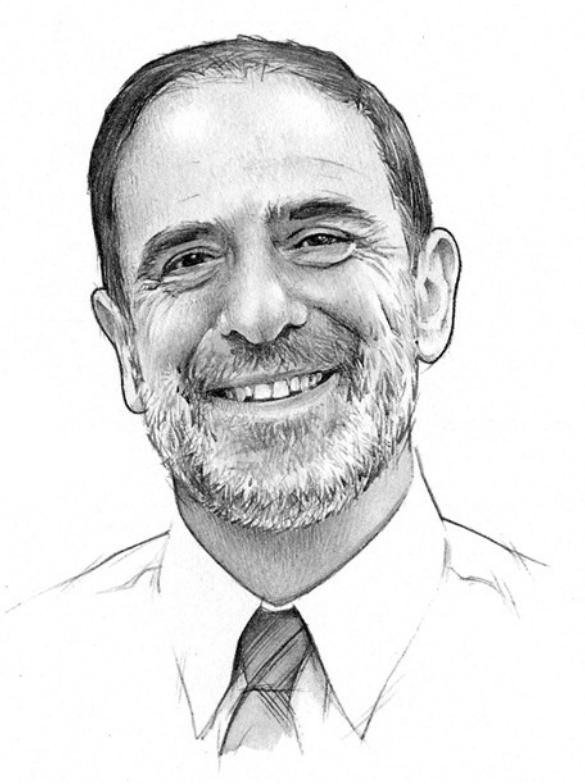
Benedict Gross

Harvard University

"Representation theory and number theory"

I plan to give a series of talks, loosely organized around the principle that one can use the (conjectural) local Langlands correspondence to discover interesting results in number theory and representation theory.

I will begin with 4-5 lectures on the local correspondence, including a refinement which predicts the formal degree of a representation in the discrete series. This leads one to the notion of a simple wild parameter, and to the construction of Reeder's simple supercuspidal representations.



I will then give 2-3 lectures on global realizations of simple supercuspidal representations. The stable trace formula allows one to count the automorphic forms with prescribed local behavior, and predicts the existence of rigid local systems on G_m over a finite field which generalize the system coming from n-variable Kloosterman sums. These local systems were recently constructed by Heinloth, Ngo, and Yun using techniques from geometric Langlands theory.

I will end with 4-5 lectures on the construction of a more general family of supercuspidal representations, which are induced from the pro-unipotent radical of a parahoric subgroup P. This involves a surprising connection between Vinberg's invariant theory and the internal structure of parahorics. Some examples related to Bhargava's recent work on the Selmer groups of elliptic curves will be discussed.

TUESDAYS, 2:40PM
BEGINNING SEPT 20TH

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MATHEMATICS HALL

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