2010 ATKIN MEMORIAL LECTURE AND WORKSHOP: ABSTRACTS OF TALKS

APRIL 30 AND MAY 1, UIC

1. Atkin Memorial Lecture "Cycles on ball quotients and modular forms" by Steve Kudla (Toronto)

Abstract: The locally symmetric varieties $Y = \Gamma \backslash D$ where D is the unit ball in $\mathbb{C}^n$ and Γ is an arithmetic subgroup of $U(n,1)$ have a rich geometry and arithmetic. Such quotients have many 'special' algebraic cycles arising as quotients $Z_x = \Gamma_x \backslash D_x$ of sub-balls $D_x \subset D$. By results of old joint work with John Millson, the generating series for the cohomology classes determined by suitable collections of such cycles are modular forms for unitary groups $U(r,r)$. Recently, in joint work with Michael Rapoport, we utilize the fact that ball quotients can be viewed as moduli spaces of abelian varieties to define arithmetic analogues of the cycles Z_x. We conjecture that the classes in arithmetic Chow groups defined by such cycles are, again, the Fourier coefficients of certain modular forms. I will discuss some evidence for such a conjecture, especially in the case of arithmetic 0-cycles.

2. "Values of Green functions on big CM points" by Steve Kudla (Toronto)

Abstract: We use a seesaw argument to compute the averages of values of automorphic Green functions on Shimura varieties of orthogonal type over the Galois orbits of special points associated to CM fields. The resulting formula involves a combination of Fourier coefficients of central derivatives of pullbacks of incoherent Eisenstein series of weight 1 for the totally real subfield and the central derivative of a certain type of L-function. This is joint work with Jan Bruinier and Tonghai Yang.

3. "CM values of automorphic Green functions over a totally real field" by Tonghai Yang (Wisconsin)

Abstract: In this talk, we explain how to construct automorphic Green functions for Kudla's special cycles on a Shimura variety of orthogonal type, and compute its CM values. This is joint work with J. Bruinier.

4. "On the structure of special cycles on the Shimura variety of $GU(1, 2)$" by Ulrich Terstiege (Harvard).

Abstract: In this talk I will discuss aspects of the structure of (arithmetic) special cycles for the Shimura variety of $GU(1, 2)$. In particular I will discuss how to obtain the structure of the special fiber of (the local version) of such cycles at an inert prime of the imaginary quadratic field.

5. "An intersection problem on the $GU(n, 1)$ Shimura variety" by Ben Howard (Boston College).

Abstract: A Shimura variety of type $GU(n, 1)$ comes equipped with two families of special cycles. The first is the family of points with complex multiplication, the second is the family of Kudla-Rapoport divisors. In this talk I will explain how to explicitly compute the arithmetic intersection multiplicities of these two types of cycles, and why one would want to do so.

6. "Algebraic cycles and p-adic L-functions" by Kartik Prasanna (Michigan).

Abstract: I will explain some applications of p-adic L-functions to algebraic cycles, for example, to give constructions of varieties over number fields with nontorsion Griffiths groups. This is related to the Bloch-Beilinson conjecture, especially its refined version involving coniveau filtrations. Joint work with Bertolini and Darmon.