



# ALGEBRA SEMINAR TALK



WITH

## GERMAN COMBARIZA

Department of Computer Science  
The University of Western Ontario

FRIDAY, JANUARY 27, 2012

2:45 P.M. – Middlesex College Room 107

### “A few conjectures about multiple zeta values”

Multiple zeta values (MZV) are the numbers defined by the convergent series of the form

$$\zeta(s_1, s_2, \dots, s_k) = \sum_{n_1 > n_2 > \dots > n_k > 0} \{1/(n_1^{s_1} \dots n_k^{s_k})\}$$

for  $s_i$  positive integers. For these real numbers there are some beautiful relations, some of them due to Euler like  $\zeta(2, 1) = \zeta(3)$  or  $\zeta(2n) = q\pi^{2n}$  for  $q$  a rational number. In this lecture I will present some of the most famous conjectures about MZV and their relations. I will show how we try to see the truthfulness of this conjecture by looking at them until a small degree bounded by the capacity of the actual computers.



É. Schost



D. Zagier



G. Combariza



M. Waldschmidt



L. Euler

Have you seen the recent results of Don Zagier and Francis Brown on MZV and in particular on the values of  $H(a, b) = \zeta(\underbrace{2, 2, \dots, 2}_a, 3, \underbrace{2, \dots, 2}_b)$  related to the mysterious values of

$\zeta(2s + 1)$  at odd natural numbers? It is all quite amazing that after almost 300 years of thinking about MZV, a connection between mixed Tate motives and the values of Feynman integrals, and MZV, appeared. Subsequently, more specific and clever calculations began surfacing with stunning force. Here German will tell us about his beautiful research with Éric Schost, which may lead to further unveiling of this ancient mystery.



ALL ARE WELCOME! ☺