

Abstracts for the conference in honor of John Labute. Montreal, November 15-16, 2007.

- **Nigel Boston:** “*Random Pro- p Groups and Random Galois Groups*”

Abstract: *Dunfield and Thurston studied how the distribution of finite quotients of a random g -generator g -relator abstract group compares with that of the fundamental group of a random 3-manifold obtained from a genus- g Heegaard splitting. We consider analogous questions for random g -generator g -relator pro- p groups and for Galois groups of maximal pro- p extensions unramified away from a finite set S of primes with $|S| = g$. Finally, we prove that random g -generator g -relator pro- p groups almost surely are FAb and have no infinite analytic quotient, i.e. satisfy the tame Fontaine-Mazur conjecture. .*

- **Michael Bush:** “*Mild groups in number theory*”

Abstract: *I will survey some of John Labute’s work on the theory of mild groups and his discovery that these groups often arise as the Galois groups of maximal p -extensions with restricted ramification. Some open problems will be discussed at the end.*

- **Farshid Hajir** “*Asymptotically Good Families*”

Abstract: *A sequence of number fields is asymptotically good if the root discriminant of the fields in question remains bounded. The only known source of these are towers inside infinite, finitely ramified extensions, the study of whose Galois groups has seen major advances recently through the work of Labute and others. In this expository talk, I will describe many other contexts in which “asymptotically good families” arise and give an axiomatization of the concept, inviting us to look for them in other situations.*

- **Manfred Kolster:** “*Higher relative class number formulas*”

Abstract: *The classical relative class number formula for a CM extension of number fields has analogues relating special values of L -functions at certain negative integers to étale (or motivic) cohomology. This is a consequence of the Main Theorem in Iwasawa Theory and of results on positive étale cohomology.*

- **Cameron McLeman:** “*The Zassenhaus Filtration of Class Field Tower Groups*”

Abstract: *The Hilbert p -class field tower over a number field is in general a rather mysterious object. Even in the case that the field is quadratic imaginary, there is no known algorithm for deciding whether or not the tower is finite. Apart from finiteness, however, much is known about the structure of the Galois group of the tower. We further this theory by proving and using a Golod-Shafarevich equality to compute some pieces of the Zassenhaus filtration of such a group,*

and use a result of Labute on one-relator pro- p -groups to place upper bounds on certain others. As an application, we develop some rather large lower bounds on the size of certain classes of these groups, perhaps providing evidence for their non-existence and thereby further restricting the already-small class of groups which can occur.

- **Jan Minac:** “*A Toast to John Labute and Galois Modules*”

Abstract: I will describe how a bottle of champagne helped me to understand the results of Labute’s thesis and how Labute’s work influenced my joint, current investigations with D. Benson, S. Chebolu, J. Labute, N. Lemire, A. Schultz, and J. Swallow on the Galois module structure of Galois cohomology and its applications.

- **Ravi Ramakrishna:** “*Ranks of new parts of Hecke Algebras*”

Abstract: Let f be an eigenform of level N . Consider the mod p Galois representation associated to f . For q a prime not dividing N , Ribet has given a criterion for when there exists a new form of level Nq with the same mod p Galois representation. Thus the level Nq and ‘new at q ’ completed Hecke algebra is nontrivial. Using Galois cohomological techniques we show for suitable composite M the level NM ‘new at M ’ completed Hecke algebra can have arbitrarily large rank.

- **Romyar Sharifi:** “*Galois groups of unramified pro- p extensions*”

Abstract: I will discuss the structure of the Galois group of the maximal unramified pro- p extension of the cyclotomic field of all p -power roots of unity. In particular, I will give a computational criterion for it to be abelian in terms of the values of certain cup products of cyclotomic p -units in the Galois cohomology of the maximal unramified outside p extension of the p th cyclotomic field.

- **Lloyd Simons:** “*Some New Results on the Coates-Sinnott Conjecture*”

Abstract: We report on an elementary approach to the annihilation of the tame kernel in cyclic extensions of totally real number fields by the appropriate higher Stickelberger ideal.

- **John Tate:** “*Symmetries of the field of algebraic numbers*”

Abstract: to follow