Speaker: Melanie Wood

Title: The average size of 3-torsion in class groups of 2-extensions

Abstract: The p-torsion in the class group of a number field K is conjectured to be small: of size at most $|\mathrm{Disc}\, K|^{\epsilon}$, and to have constant average size in families with a given Galois closure group (when p doesn't divide the order of the group). In general, the best upper bound we have is $|\mathrm{Disc}\, K|^{1/2+\epsilon}$, and previously the only two cases known with constant average were for 3-torsion in quadratic fields (Davenport and Heilbronn, 1971) and 2-torsion in non-Galois cubic fields (Bhargava, 2005). We prove that the 3-torsion is constant on average for fields with Galois closure group any 2-group with a transposition, including, e.g. quartic D_4 fields. We will discuss the main inputs into the proof with an eye towards giving an introduction to the tools in the area. This is joint work with Robert Lemke Oliver and Jiuya Wang.