

# Mathematics Colloquium

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# The Norm Residue Is an Isomorphism

*Abstract: Milnor conjectured in 1970 that the étale cohomology of a field (mod 2 coefficients) should have a presentation with units as generators and simple quadratic relations (the ring with this presentation is now called the “Milnor K-theory”). This was proven by Voevodsky, but the odd version (mod  $p$  coefficients for other primes) has been open until this year, and has been known as the Bloch-Kato Conjecture.*

*Using certain norm varieties, constructed by Rost, and techniques from motivic cohomology, we now know that this conjecture is true. This talk will be a non-technical overview of the ingredients that go in to the proof, and why this conjecture matters to non-specialists.*

*Here is a fun consequence of all this. We now know the first 20,000 groups  $K_n(\mathbb{Z})$  of the integers, except when 4 divides  $n$ . The assertion that these groups are zero when 4 divides  $n$  ( $n > 0$ ) is equivalent to Vandiver’s Conjecture (in number theory), and if it holds then we have fixed Kummer’s 1849 proof of Fermat’s Last Theorem. If any of them are nonzero, then the smallest prime dividing the order of this group is at least 16,000,000.*

**Wednesday, November 19**

**4:00-5:00 pm  
204 Smith Hall**