**MICHAEL BENNETT**, University of British Columbia

*Twisted extensions of the cubic case of Fermat's Last Theorem*

We classify primes $p$ for which there exist elliptic curves $E/\mathbb{Q}$ with conductor $N_E \in \{18p, 36p, 72p\}$ and nontrivial rational 2-torsion, and, in consequence, show that, for "almost all" primes $p$, the Diophantine equation

$$x^3 + y^3 = p^\alpha z^n$$

has at most finitely many solutions in coprime nonzero integers $x, y$ and $z$ and positive integers $\alpha$ and $n \geq 4$. To prove this result, we appeal to such disparate techniques as lower bounds for linear forms in $p$-adic logarithms, Schmidt's Subspace Theorem, and methods based upon Frey curves and modularity of associated Galois representations.

This is joint work with Florian Luca and Jamie Mulholland.