## Arithmetic Geometry

http://www2.warwick.ac.uk/fac/sci/maths/people/staff/samir_siksek/ecm

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**Friday, July 6, 10:45–12:45, Seminar Hall**

TALKS:
Sander Dahmen (*Utrecht, NL*), COAUTHORS: Mike Bennett, **Klein forms and the generalized superelliptic equation**

Tim Dokchitser (*Bristol, UK*), COAUTHORS: Vladimir Dokchitser, **Parity conjecture for elliptic curves**

Michael Stoll (*Bayreuth, DE*), **Rational points on curves**

Szabolcs Tengely (*Debrecen, HU*), COAUTHORS: Attila Pethoe, **Composite rational functions**

## Klein forms and the generalized superelliptic equation

Sander Dahmen
*Utrecht, NL*

Let $F$ be a binary form over the integers and consider the exponential Diophantine equation $F(x, y) = z^n$ with $x$ and $y$ coprime. For general $F$ it seems very difficult to solve this equation, but as we will explain in this talk, for so-called Klein forms $F$, the modular method can provide a good starting point. Together with solving certain infinite families of Thue equations, we can show in particular, that there exist infinitely many (essentially different) cubic forms $F$ for which the equation above has no solutions for large enough exponent $n$. This is joint work with Mike Bennett.

Coauthors: Mike Bennett

# Parity conjecture for elliptic curves

Tim Dokchitser
*Bristol, UK*

This is an overview talk about the Birch-Swinnerton-Dyer conjecture and the $p$-Parity Conjecture for elliptic curves. I will explain what they are about, what is known, and some of the mysterious consequences of the conjectures. Finally, I will say a few words about the proof of the $p$-Parity Conjecture for elliptic curves over the rationals, and why finiteness of Sha implies it over general number fields as well. This is joint work with Vladimir Dokchitser.

COAUTHORS: Vladimir Dokchitser

# Rational points on curves

Michael Stoll
*Bayreuth, DE*

Mordell conjectured, and Faltings proved, that an algebraic curve over the rational numbers and of genus at least two can only have finitely many rational points. All known proofs of this statement are ineffective: they do not provide an algorithm that determines this finite set. I will give an overview of methods that can be used in many cases (although they are not guaranteed to work) and are frequently successful, as demonstrated by many examples.

## Composite rational functions

Szabolcs Tengely
*Debrecen, HU*

In this talk we consider rational functions $f = P/Q$ with a bounded number of zeros and poles. There is a variety such that points on the variety lead to solutions of the equation $f(x) = g(h(x))$ where $g$ and $h$ are rational functions. We use this to characterize all composite rational functions having at most $4$ distinct zeroes and poles. This is joint work with Attila Pethoe.

COAUTHORS: Attila Pethoe