"Can't you just work over the reals?"

– Lukas

# The Trivial Notions Seminar
## Proudly Announces

### Transcendental Galois theory and motives

A talk by

## Tom Lovering

**Abstract**

What should be the Galois closure of $\mathbb{Q}(\pi)$? One way to answer this question might be to remark that there is an 'irreducible-looking' power series

$$\frac{\sin z}{z} = 1 - z^2/3! + z^4/5! - ... = \prod_{n\in\mathbb{Z}, n\neq 0} (1 - \frac{z}{n\pi}),$$

which should play the role of the irreducible polynomial witnessing that $Q(\pi)$ is itself Galois and with Galois group something like $\mathbb{Q}^*$ (it should permute the roots, but the automorphism taking $\pi \mapsto n\pi$ had better have inverse taking $\pi \mapsto (1/n)\pi$).

In this talk we will explain that although naively following the idea above fails badly, in the case where the transcendental numbers in questions are periods: numbers naturally arising from integration on algebraic varieties defined over number fields, then Grothendieck's theory of motives together with his conjecture on the transcendence of periods give a well-defined and practical answer to such questions with deep implications for transcendental number theory.

## Thursday, November $13^{\text{th}}$, at 1:15 pm
## Science Center 222