STEFANO LUNEIA, University of Ottawa

Morita $(\infty, 2)$-categories and beyond

One difficulty in constructing an (∞, n)-category is showing that the different ways of composing morphisms fit together coherently. Bimodules give a familiar example. Viewed as arrows between rings, they compose by tensor product over the middle ring. This operation is associative up to canonical isomorphism, and those isomorphisms must be compatible when we compose longer strings of bimodules. Complicial sets express these compatibilities in terms of simplices and their faces. I will explain how my coauthors and I use this idea to construct the Morita $(\infty, 2)$-category of a monoidal category admitting a calculus of balanced tensor products.

I will then discuss work in progress on extending this construction to obtain an $(\infty, 3)$-category from a symmetric monoidal category. Time permitting, I will close with a proposal for an (∞, ∞)-category of manifolds and cobordisms, fully extended down to points and admitting iterated cobordisms in arbitrarily high dimensions.