Speaker: Angela Gibney
Abstract: The moduli space of stable curves with marked points and coordinates offers a natural setting for studying smooth curves and their degenerations. These spaces are connected through tautological maps that reflect their recursive nature. Many useful algebraic constructions associated with these spaces are functorial with respect to such maps.

One particularly rich source of such structures comes from vector bundles of coinvariants and their duals, vector bundles of conformal blocks, defined via representations of VOAs. In these lectures, I will describe our recent program, extending foundational results about these in low-genus, and for particular examples, to all genera and for a broad class of VOAs.

The first lecture will give motivation and background, including a brief overview of the moduli spaces and a key tool known as the mode transition algebra. The second lecture will focus on understanding what happens to these structures when curves develop singularities, highlighting factorization and smoothing techniques (including a proof of a long-standing conjecture of Zhu). The final lecture will describe applications of this framework to the geometry of moduli spaces, the construction of tensor products, and criteria for rationality.

While the actual constructions are quite involved, the talks will aim for a conceptual and non-technical perspective.

Speaker: Terry Gannon
Abstract: It's very hard to find examples of CFTs or VOAs which aren't directly related to Lie algebras or finite groups or lattices. Is this because these exotic theories are rare, or is it because our methods are still too classical? I hope the latter. We are getting better at constructing exotic tensor categories, e.g. modular tensor categories which have no known relation to Lie algebras etc. The most famous example is the Haagerup (more precisely its centre). There has been exciting recent effort in the physics literature toward realizing the Haagerup and related tensor categories in physics. The characters of a rational CFT (VOA) can be enhanced from vector-valued modular forms into vector-valued Jacobi forms, which give much more information. In my talk I'll use this to show e.g. that the smallest potential Haagerup VOA has c=24 and lies in the Monstrous Moonshine module.