GLEN seminar

Edinburgh, Friday 9 December 2022

All talks will happen in JCMB 4325A

13:00 Fei Xie (Edinburgh)

Quadric surface bundles and relative Hilbert schemes of lines

For a quadric surface bundle with simple degeneration (fibres have corank at most 1), there is a well established relation between its derived category and its relative Hilbert scheme of lines. For a smooth 4-fold with the structure of a quadric surface bundle over a smooth surface, there is a finite number of fibres with corank 2 and this relation fails. I will discuss how to fix the relation in this case at a categorical level.

14:15 Matthew Pressland (Glasgow)

Calabi–Yau algebras from consistent dimer models

A dimer model is a bipartite graph drawn in a topological surface, which determines a typically non-commutative algebra. Under certain combinatorial consistency conditions, this algebra turns out to be Calabi–Yau, either on the nose or in a relative sense when the surface has boundary. I will explain this result, focussing on dimer models on the torus and on the disk. I will then describe some applications, which turn out to be quite different in the two cases: dimer models on the torus have applications in algebraic geometry, yielding resolutions of singularities of Gorenstein toric 3-folds, whereas those on the disk lead to categorifications of cluster algebra structures on certain Lie-theoretic varieties.

16:00 Tom Wennink (Liverpool)

A reconstruction theorem for genus 2 Gromov-Witten invariants.

One can use relations in the tautological ring of the moduli space of curves to obtain relations among Gromov-Witten invariants. This method has been used to give reconstruction theorems for Gromov-Witten invariants in genus 0 (Kontsevich-Manin) and in genus 1 (Getzler).
We use Pixton's tautological relations to prove a reconstruction theorem for genus 2 Gromov-Witten invariants.