



## NITheP Webinar

Thursday, 19 November 2020, 14h00

**Dr Sanjaye Ramgoolam**  
Queen Mary University of London

### **Kronecker coefficients and Lattices of bipartite ribbon graphs**

**Abstract:** Bipartite ribbon graphs are associated with a rich geometry of surfaces (notably Belyi maps) and at the same time have an elegant combinatoric characterisation in terms of permutation pairs. An associative algebra constructed from the permutation pairs has a block decomposition in terms of simple matrix algebras labelled by triples of Young diagrams. Solvable quantum mechanical models on these algebras are used to realize Kronecker coefficients in terms of the counting of vectors in a lattice of ribbon graphs. This points towards quantum algorithms for calculating Kronecker coefficients, a problem of interest in computational complexity theory. The quantum mechanical models have an interpretation in terms of quantum membrane worldvolumes. This talk is based on the paper <https://protect-za.mimecast.com/s/mESiCy8k2Rt6VP78HP2eYy?domain=arxiv.org>

**Bio:** Dr Ramgoolam is a theoretical physicist working on string theory, representation theory and combinatorics. His work has focused on the development of algebras and representation theory as an approach to the study of gauge-string duality in the contexts of two-dimensional Yang Mills theory, the AdS/CFT correspondence, matrix models and tensor models. In recent inter-disciplinary work he has developed new matrix models for applications to computational linguistics. He holds the positions of Reader in theoretical physics at Queen Mary University of London and Visiting Professor at Wits University. He has previously been STFC Advanced Fellow and held post-doctoral positions at Princeton and Brown Universities.

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