

# Representation Theory, Geometry & Combinatorics Seminar

Organizer: Mark Haiman & Kolya Reshetikhin

Monday, 4:10–6:00pm, 939 Evans

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March 17 **Sergiy Koshkin**, Northwestern

*Universal Chern-Simons invariants and Gromov-Witten potentials*

Large  $N$  duality of Gopakumar-Vafa predicts a correspondence between quantum Chern-Simons invariants of 3-manifolds and Gromov-Witten invariants of their dual complex threefolds. I will offer a way of constructing the conjectural large  $N$  duals to Seifert spaces by fibering resolutions of quasihomogeneous surface singularities over  $CP^1$ .

An expectation is that the  $SU_N$  Chern-Simons invariants at all ranks and levels can be unified into a universal holomorphic function related to the Gromov-Witten potential of the dual threefold. I will describe a procedure for defining these functions that gives combinatorial expressions for them similar to the topological vertex sums for Gromov-Witten potentials.