

Workshop on Representation Theory, Geometry & Combinatorics

Organizer: Mark Haiman

Monday June 2–Friday June 6, 9:30–5:00pm, Bechtel 120ABC

Leonardo Mihalcea, Duke

Quantum K-theory of the Grassmannian

If X is a Grassmannian (or an arbitrary homogeneous space) the 3-point, genus 0, Gromov-Witten invariants count rational curves of degree d satisfying certain incidence conditions—when this number is expected to be finite. If the number is infinite, Givental and Lee defined the K-theoretic Gromov-Witten invariants, which compute the sheaf Euler characteristic of the space of rational curves in question, embedded in Kontsevich’s moduli space of stable maps. The resulting quantum cohomology theory—the quantum K-theory algebra—encodes the associativity relations satisfied by the K-theoretic Gromov-Witten invariants.

In joint work with Anders Buch, we shown that the (equivariant) K-theoretic Gromov-Witten invariants for Grassmannians are equal to structure constants of the ordinary (equivariant) K-theory of certain two-step flag manifolds. We therefore extended—and also reproved—the “quantum = classical” phenomenon earlier discovered by Buch-Kresch-Tamvakis in the case of the usual Gromov-Witten invariants. Further, we obtained a Pieri and a Giambelli rule, which yield an effective algorithm to multiply any two classes in the quantum K algebra.