1031-57-2   **Satyan L. Devadoss***, Williams College. *The topology of particle collisions.*

Configuration spaces are not only fundamental objects in mathematics, but appear in numerous areas such as robot motion planning, DNA sequencing, sensor networks, surface reconstruction, and origami designs. Our story is motivated by the configuration space of particles on spheres. In the 1970's, Deligne and Mumford constructed a way to keep track of particle collisions in this space using Geometric Invariant Theory. In the 1980's, this (compactified) moduli space was remarkably used by Gromov and Witten as invariants arising from string field theory. In the 1990's, Kontsevich and Fukaya generalized these ideas when studying deformation quantization to include particle collisions on spheres with boundary, appearing in open-closed string field theory.

    This talk, using visual brushstrokes, focuses on the topology of the real points of particle collisions. These real analogs can be understood from several viewpoints, from tilings of convex polytopes, to blowups of hyperplane arrangements, to underlying algebraic operad structures. Moreover, these novel spaces now appear across a broad spectrum of research, from geometric group theory, to combinatorics, to phylogenetic statistics. The entire talk is heavily infused with visual imagery. (Received November 15, 2006)