Geometry, Groups and Dynamics/GEAR Seminar
(held at the Illinois hub of GEAR)

12:00 pm, 243 Altgeld Hall,Thursday, September 20, 2018
Moira Chas (Stony Brook)
The generalization of the Goldman bracket to three manifold and its relation to Geometrization

Abstract: In the eighties, Bill Goldman discovered a Lie algebra structure on the free abelian group with basis the free homotopy classes of closed oriented curves on an oriented surface S. In the nineties, jointly with Dennis Sullivan, we generalized this Lie algebra structure to families of loops (defining the equivariant homology of the free loop space of a manifold). This Lie algebra, together with other operations in spaces of loops is now known as String Topology. The talk will start with a discussion of the Goldman Lie bracket in surfaces, and how it "captures" the geometric intersection number between curves. It will continue with the description of the string bracket, which generalizes of the Goldman bracket to oriented manifolds of dimension larger than two, and the space of families of loops where the string bracket is defined. The second part of the lecture describes how this structure in degrees zero and one plus the power operations in degree zero recognizes key features of the Geometrization, the above mentioned joint work. The lions share of effort concerns the torus decomposition of three manifolds which carry mixed geometry. This is joint work with Siddhartha Gadgil and Dennis Sullivan.