Speaker: **Harvey, Shelly**
Title: *Higher-Order 3-manifold Invariants with Applications to the Thurston Norm and Symplectic 4-manifolds*
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Abstract: We define an infinite sequence of new invariants, δ_n, of a group G that measure the size of the successive quotients of the derived series of G. In the case that G is the fundamental group of a 3-manifold, we obtain new 3-manifold invariants. These invariants are closely related to the topology of the 3-manifold. They give lower bounds for the Thurston norm which provide better estimates than the bound established by McMullen using the Alexander norm. We also show that the δ_n give obstructions to a 3-manifold fibering over S^1 and to a 3-manifold being Seifert fibered. Moreover, we show that the δ_n give computable algebraic obstructions to a 4-manifold of the form $X \times S^1$ admitting a symplectic structure even when the obstructions given by the Seiberg-Witten invariants fail. There are also applications to the minimal ropelength and genera of knots and links in S^3.