

The SUMO Speaker Series for Undergraduates

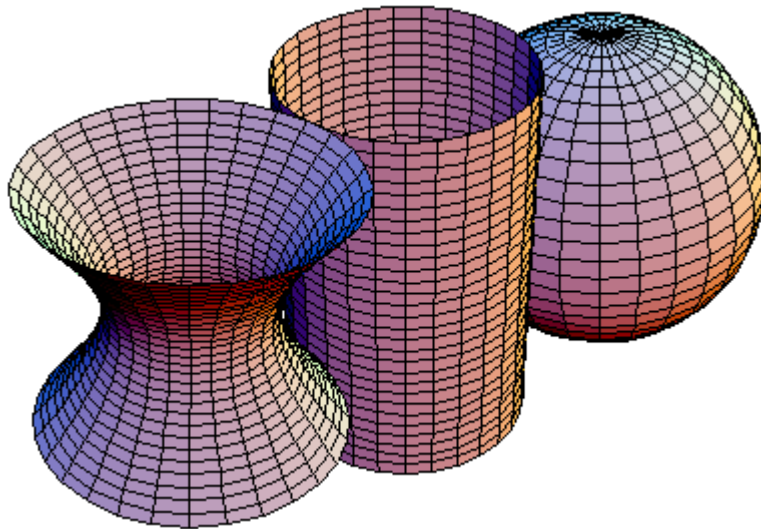
(Food Provided)

Wednesday, April 4th

4:15-5:05, room 380C

Uniformization and geometry: the quest for canonical geometric structures on manifolds

Professor Yanir Rubinstein



ABSTRACT:

What is the "best", or most canonical, geometric structure on a given smooth manifold? For example, any smooth manifold can be equipped with a smooth metric, by which we mean a "smoothly varying" assignment of inner product to the tangent spaces along the manifold (so as to measure magnitudes of velocity vectors along curves, and hence length of paths in the manifold). The metric allows one to define many geometric concepts, such as an intrinsic notion of curvature. Are there "best" choices of a smooth metric?

In the case of surfaces, a natural metric is one of constant curvature. The Uniformization Theorem implies that any compact smooth surface admits such a metric, with the sign of the curvature determined by the genus (number of "holes"). In this talk we will explore higher-dimensional analogues of this result related to "Einstein metrics". This is a century-old problem that remains baffling and wide open, and lies at the cross-roads of differential geometry, algebraic geometry, partial differential equations, and several complex variables.

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