Department of Mathematics, BGU

Colloquium

On *Tuesday, May ,26 2015*

At *14:30 – 15:30*

In *Math 101-*

Emanuel Milman (Technion)

will talk about

Curvature-Dimension Condition for Non-Conventional Dimensions

Abstract: Given an n-dimensional Riemannian manfiold endowed with a probability density, we are interested in studying its isoperimetric, spectral and concentration properties. To this end, the Curvature-Dimension condition CD(K,N), introduced by Bakry and Emery in the 80's, is a very useful tool. Roughly put, the parameter K serves as a lower bound on the weighted manfiold's "generalized Ricci curvature", whereas N serves as an upper bound on its "generalized dimension". Traditionally, the range of admissible values for the generalized dimension N has been confined to [n,infty]. In this talk, we present some recent developments in extending this range to N > ,1 allowing in particular negative (!) generalized dimensions. We will mostly be concerned with obtaining sharp isoperimetric inequalities under the Curvature-Dimension condition, identfiying new one-dimensional model-spaces for the isoperimetric problem. Of particular interest is when curvature is strictly positive, yielding a new single model space

(besides the previously known N-sphere and Gaussian measure): the sphere of (possibly negative) dimension N<1, which enjoys a spectral-gap and improved exponential concentration.

Time permitting, we will also discuss the case when curvature is only assumed non-negative. When N is negative, we confirm that such spaces always satisfy an N-dimensional Cheeger isoperimetric inequality and N-degree polynomial concentration, and establish that these properties are in fact equivalent. In particular, this renders equivalent various weak Sobolev and Nash inequalities for dffierent exponents on such spaces.