



## Department of Mathematics University of Toronto



The fifth annual  
R.A. Blyth Lectures in Mathematics

### Professor Jeff Cheeger

Courant Institute of Mathematical Sciences

will give three lectures on

## The Small Scale Structure of Spaces of Bounded Curvature

**Abstract:**

Can a smooth object which is not very curved possess interesting structure (say tiny handles) on extremely small scales? The well known tendency of small objects (like BB's) to be highly curved might tend to suggest that the answer is: 'No.' On the other hand, there do exist (mathematical) objects called 'flat tori', which can be arbitrarily small, but which have no curvature at all (flat tori are certain analogs of circles in dimensions 2 and above). Thus, the general answer to our question should be: 'Yes, but only under special circumstances.' A more detailed answer to this and related questions will be provided in the lectures.

In the first lecture, we will describe various illustrative examples, including flat tori and so-called 'almost flat manifolds.' We will also explain the fundamental ideas of 'almost rigidity' and 'approximate symmetry' on which the theories to be presented in the subsequent lectures are based. In the second lecture, we will give the detailed answer to the specific question raised above. A key role in the discussion is played by almost flat manifolds, remarkable objects which strongly resemble spaces with no curvature, while differing from them in essential respects. The third lecture will deal with corresponding issues in the more general context of spaces whose curvature is not very negative. Here, many new phenomena arise.

**For further information please contact**

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**Curvature Bounds, Almost Rigidity  
and Approximate Symmetry**

Monday, March 31, 1997  
at 4 pm  
Sidney Smith Hall  
Room 2117

**The Structure of Spaces  
of Bounded Curvature**

Wednesday, April 2, 1997  
at 4 pm  
Sidney Smith Hall  
Room 2117

**The Structure of Spaces Whose  
Ricci Curvature is Bounded Below**

Friday, April 4, 1997  
at 4 pm  
Sidney Smith Hall  
Room 5017A