# Warwick Mathematics Institute
# Workshop on 3-manifolds
## 23 July 2015
### Organiser: Vaibhav Gadre

## PROGRAMME

All lectures will be held in Room B3.02

**11:00-12:00 Nathan Dunfield** (UIUC) *A tale of two norms*
Abstract: The first cohomology of a hyperbolic 3-manifold has two natural norms: the Thurston norm, which measure topological complexity of surfaces representing the dual homology class, and the harmonic norm, which is just the $L^2$ norm on the corresponding space of harmonic 1-forms. Bergeron-Sengun-Venkatesh recently showed that these two norms are closely related, at least when the injectivity radius is bounded below. Their work was motivated by the connection of the harmonic norm to the Ray-Singer analytic torsion and issues of torsion growth in homology of towers of finite covers. After carefully introducing both norms, I will discuss new results that refine and clarify the precise relationship between them; one tool here will be a third norm based on least-area surfaces. This is joint work with Jeff Brock.

12:00-14:00 Lunch Break

**14:00-15:00 Jacob Rasmussen** (Cambridge) *Floer simple manifolds and L-space intervals*
Abstract: A rational homology solid torus Y is said to be Floer simple if it has more than one L-space filling. In this case, the set of L-space filling slopes forms an interval in the circle of slopes. I'll explain how to characterize this interval in terms of the Turaev torsion of Y and discuss the relevance of this result to Boyer-Gordon-Watson's L-space = non left-orderable $\pi_1$ conjecture. This is joint work with Sarah Rasmussen.

15:00-15:30 Tea

**15:30-16:30 Liam Watson** (Glasgow) *L-spaces vs. left-orderability for graph manifolds*
Abstract: It is conjectured that L-spaces -- those three-manifolds with simplest-possible Heegaard Floer homology -- are characterized by having non-left-orderable fundamental group. The first family of examples suggesting this relationship is provided by Seifert fibred spaces, a result that follows from work of Boyer-Rolfsen-Weist and Lisca-Stipsicz and passes via contact topology and foliation theory. While it is natural to ask if the same is true for general graph manifolds, this seems to be a much more involved problem. This talk will give some context for the conjecture and describe some recent progress towards understanding graph manifolds. This is joint work with Jonathan Hanselman.

WMI

THE UNIVERSITY OF
WARWICK