UNIVERSITY of WISCONSIN
UWMILWAUKEE
Department of
Mathematical Sciences

Dissertation Defense
Joseph Tidmore
PhD Student

UW-Milwaukee

Wednesday
April 26
EMS Building
Room E495
3:30pm

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Cocompact Cubulations of Mixed 3-manifolds

Geometric group theory studies the connections between the algebraic properties of a group and the topological and geometric properties of spaces on which the group acts. If G is the fundamental group of a 3-manifold M, then G acts on the universal cover of M, but maybe we can learn more about G by studying an action on another space with a nice combinatorial structure. Learning more about the group can also tell us more about the space. Recently, two big conjectures for hyperbolic 3-manifolds, the virtual Haken and virtual fibering conjectures, were resolved by showing that hyperbolic 3-manifold are virtually compact special, meaning they act properly, cocompactly, and in a "special" way on a CAT(0) cube complex, proved by Wise and Agol in the cusped hyperbolic and closed cases respectively.
A natural outgrowth of this breakthrough is the goal of classifying which 3-manifold groups are virtually compact special, which was known in every case except the case of mixed manifold groups. A mixed manifold is an aspherical 3-manifol which can be cut along embedded tori, called JSJ tori, so that each component, or block, of the cut open space admits either a hyperbolic geometric structure or admits the structures of a Seifert fibered space. In this defense, we will discuss the main result of my dissertation proves that the fundamental group of a mixed manifold M is virtually compact special iff M is chargeless, meaning that interior Seifert fibered block in the JSJ decomposition of M has a trivial euler number relative to the fibers of adjacent Seifert fibered blocks.

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