1136-51-591 **Facundo Memoli** and **Osman Berat Okutan*** (okutan.1@osu.edu). *Reeb Posets and Tree Approximations.*

A well known result in the analysis of finite metric spaces due to Gromov says that given any (X, d_X) there exists a *tree metric* t_X on X such that $\|d_X - t_X\|_\infty$ is bounded above by twice $\mathrm{hyp}(X) \cdot \log(2\,|X|)$. Here $\mathrm{hyp}(X)$ is the *hyperbolicity* of X, a quantity that measures the *treeness* of 4-tuples of points in X. This bound is known to be asymptotically tight.

We improve this bound by restricting ourselves to metric spaces arising from filtered posets. By doing so we are able to replace the cardinality appearing in Gromov's bound by a certain poset theoretic invariant (the maximum length of fences in the poset) which can be much smaller thus significantly improving the approximation bound.

At the core of our results lies the adaptation of the Reeb graph and Reeb tree constructions and the concept of hyperbolicity to the setting of posets, which we use to formulate and prove a tree approximation result for any filtered poset. (Received January 22, 2018)