RESEARCH STATEMENT OF MARIA BEATRICE POZZETTI

I am a second year PhD student at ETH and I am mainly interested in the study of bounded cohomology (both of groups and of topological spaces) and in its applications to geometry and representation theory.

In a recent preprint with Bucher, Burger, Frigerio, Iozzi and Pagliantini we studied metric properties of the bounded cohomology of the fundamental group of a graph of groups with amenable edge groups and showed that there is an isometric injection of the direct sum of the bounded comology of the vertex groups into the bounded cohomology of the fundamental group of the graph of groups. We also applied these results to give a self-contained proof of the additivity of the simplicial volume with respect to gluings along submanifolds with amenable fundamental group.

Apart from these aspects, my research focuses on the applications of bounded cohomology to the study of representations of discrete groups into Lie groups of Hermitian type. In this field bounded cohomology can be used to define numerical invariants that allow to select some preferred components of the representation variety, the so-called maximal representations.

Currently I am studying maximal representations of lattices in $PU(1,m)$ with target an Hermitian Lie group G. Conjecturally all these representations are equivariant with a totally geodesic tight embedding of the complex hyperbolic m-space, that is the symmetric space associated to $PU(1,m)$, into the symmetric space of G. As a first step towards the proof of this conjecture I managed to show that, in the cocompact case, all representations with this property are locally rigid.