Groups in Madrid 2019

Talks will be in Aula Naranja except from the colloquium that will be on Aula Azul.

Thursday 28	**Friday 29**	**Friday 29**
14:30 Registration	10:30 Yves Cornulier	15:00 Yuri Neretin
15:00 Gili Golan	11:30 Coffee Break	16:00 Coffee Break
16:00 Coffee Break	12:00 Colloquium by Martin Bridson	16:30 Tara Brendle
16:30 Collin Bleak	13:00 Lunch break	20:30 Dinner
17:30 Pep Burillo		

Abstracts

Collin Bleak *On maximal subgroups of R. Thompson's group V.*

The subgroup structure of the R. Thompson groups F, T, and V have come under serious scrutiny lately due to to some groundbreaking results in C^*-algebras, arising initially from work of Haagerup and Olesen on the amenability of F. Their work opened a door, and peoples' interest immediately lead (by further transformative work of Kalantar and Kennedy, Adrienne Le Boudec, Nicolas Matte-Bon, and others) to a complete transformation of our understanding of C^*-simplicity. One key and surprising result here: Matte Bon and Le Boudec provide examples of finitely presented C^*-simple groups without free subgroups.

In any case, the work above leads to many interesting questions around the subgroup structures of F, T, and V. In this talk, we give a report on our (with Jim Belk, Martyn Quick, and Rachel Skipper) current work towards classifying the maximal subgroups of V.

Tara Brendle *The Steinberg module and level structures for surfaces with marked points*

It is known by work of Harer and Ivanov that the mapping class group of a surface is a virtual duality group, and that its dualizing module is the Steinberg module, that is, the unique nonzero homology group of the complex of curves associated to the surface. In this talk, we will give an explicit description of the Steinberg module for surfaces with marked points based on work of Harer and explain applications to finding nontrivial cohomology in the level L congruence subgroups of the corresponding mapping class groups. This is work in progress with Andy Putman and Nathan Broaddus; it builds on work of Fullarton-Putman in the case of closed surfaces.

Martin Bridson *Finite shadows of infinite groups*

There are many situations where it is natural, convenient or necessary to explore infinite groups via their finite-dimensional representations or their actions on finite objects. How much understanding can one gain about an infinite group in this way? Sometimes little, sometimes a lot. Do there exist algorithms that decide what the finite images of a group are? Which groups are completely determined by their finite images?

I shall sketch some of the rich history of these problems and explain how input from geometry and low-dimensional topology has transformed the subject in recent years.

Pep Burillo *An irrational-slope Thompson's group*

Let $\tau = 0.618..$ be the small golden ratio, zero of the polynomial $x^2 + x - 1$. In 1995 Sean Cleary introduced the irrational-slope Thompson's group F_τ, which is the group of piecewise-linear maps of the interval $[0, 1]$ with breaks in $\mathbb{Z}[\tau]$ and slopes powers of τ. In this talk I will describe this group using tree-pair diagrams in Thompson's group style, and then I will show a finite presentation, a normal form, and prove that its commutator subgroup is a simple group. This group is the first example of a group of piecewise-linear maps of the interval whose abelianisation has torsion, and it is an open problem whether this group is a subgroup of Thompson's group F. This is joint work with Brita Nucinkis and Lawrence Reeves.

Yves Cornulier *Commensurating actions, partial actions and applications to piecewise groups*

Abstract: We are interested in groups of piecewise homeomorphisms of the circle, piecewise preserving some geometric structure. For instance, the group of piecewise oriented isometries (also known as IET, group of interval exchanges), the piecewise affine group, etc. Using Exel's notion of partial action, one obtains natural commensurating actions of these groups. As an example of application, one obtains that the piecewise projective group (i.e., defined piecewise by homographies) has no infinite subgroup with relative Property T. The same method provides information about distorted elements. The method consists in each case in proving that the given subgroup preserves a geometric structure. For instance, in the affine case it preserves a structure of 1-dimensional affine manifold and one deduces restriction on these subgroups from the classification of these affine structures.

Gili Golan *Divergence functions of Thompson groups.*

The divergence function of a group generated by a finite set X is the smallest function f(n) such that for every n every two elements of length n can be connected in the Cayley graph (corresponding to X) by a path of length at most f(n) avoiding the ball of radius n/4 around the identity element. We prove that R. Thompson groups F, T and V have linear divergence functions. Therefore the asymptotic cones of these groups do not have cut points. This is joint work with Mark Sapir

Yuri Neretin *Binfinite symmetric groups and cobordisms of triangulated surfaces*

Let G be the product of three copies of the infinite symmetric group $S(\infty)$. The diagonal subgroup K of G and stabilizers $K(n) \subseteq S(\infty)$ of the first n points. We show that double coset spaces $K(m)\backslash G/K(m)$ form a category and this category acts in a natural way in unitary representations of G. This category admits a description in terms of cobordisms of colored triangulated surfaces and the set $K(0)\backslash G/K(0)$ is in one-to-one correspondence with Belyi data.