Abstracts

(last update: August 4, 2019)

Abert, Miklos **Point processes, cost and the growth of rank for locally compact groups**	August 5, 2019 9:30-10:20

The cost of a vertex transitive graph is the infimum of the expected degree of an invariant random wiring of the graph. Similarly, one can define the cost of a point process on a homogeneous space, as the infimum of the average degree of a factor wiring on its points. It turns out that the cost of a Poisson process is maximal among point processes of the same density, by proving that all free processes weakly contain the Poisson. The cost is related to the growth of the minimal number of generators of lattices in Lie groups. We expect that for semisimple Lie groups, the minimal number of generators is sublinear in the volume except for SL(2,R). We outline partial results in this direction and pose some open problems. This is joint work with Samuel Mellick.

Bekka, Bachir **On characters of infinite groups**	August 6, 2019 11:00-11:50

Let G be a countable infinite group. Unless is G virtually abelian, a description of the unitary dual of G (that is, the equivalence classes of irreducible unitary representations of G) is hopeless, as a consequence of theorems of Glimm and Thoma.

A sensible substitute for the unitary dual is the set Char(G) of characters of factorial traceable representations of G. The set Char(G) contains in general both finite and infinite characters. The set of finite characters has been described for some classes of discrete groups. In contrast, the set of infinite characters of G is much more mysterious. We will give an overview of recent results about the description of finite as well as of infinite characters for some examples of groups.

Doucha, Michal **Spaces of Lipschitz functions on finitely generated and Lie groups**	August 6, 2019 14:30-15:20

The study of spaces and algebras of Lipschitz functions on metric spaces is the functional-analytic investigation of metric geometry, analogously as C(X) spaces/algebras, resp. L∞ spaces/algebras, are the functional-analytic investigation of topology, resp. measure theory.

In this talk I will give an introduction to this subject and show how by approximating Lipschitz functions on Euclidean spaces by Lipschitz functions on lattices in Euclidean spaces one is naturally led to consider more generally Lipschitz functions on Lie groups and their approximations by Lipschitz functions on lattices in them. I will present the result that the space of Lipschitz functions on a finitely generated torsion-free nilpotent group is isomorphic to the space of Lipschitz functions on a Carnot group containing the discrete group as a lattice (provided such a Carnot group exists). It is based on a joint paper with L. Candido and M. Cúth.

Elek, Gabor **Free amenable actions of nonamenable groups**	August 6, 2019 9:30-10:20
The amenability of a free continuous action of a countable group on a compact metric space have multiple meanings. An action can be Zimmer-amenable with respect to a quasi-invariant probability measure, Borel-hyperfinite or topologically amenable. First, I will talk about a canonical (and surprisingly elementary) construction that gives rise to Zimmer-amenable actions of nonamenable groups. For exact groups such an action can be made topologically amenable. If the group is even of finite asymptotic dimension, then using the breakthrough result of Conley, Jackson, Marks, Seward and Tucker-Drob one can even make the action Borel hyperfinite. I will discuss two interesting tools for such amenable constructions: weighted Benjamini-Schramm convergence and Invariant Random Cocycles. (joint work with Konrad Krolicki).	

Finn-Sell, Martin **The quantitative Baum—Connes conjecture for some lacunary hyperbolic groups**	August 5, 2019 14:30-15:20
At this point, it's well known that the Baum—Connes conjecture has various counterexamples to its many forms (the version for groupoids, and the version with coefficient algebras attached and the geometric version). The groups for which the conjecture fails with coefficients are known as "Gromov Monsters", and they contain expander graphs embedded in their Cayley graphs in some weak metric sense. These groups are produced using probabilistic methods and rely on small cancellation theory to confirm their existence. Many such examples can be made "as hyperbolic as possible" even whilst not being finitely presented - this should be take to mean that they're direct limits of a sequence of hyperbolic groups that have a strong relationship between the injectivity radius of the connecting maps in the limit diagram and the hyperbolicity of the sequence terms. This class of groups was dubbed "lacunary hyperbolic" by Osin—Ol'Shanskii—Sapir, and is well known to contain a variety of complex and pathological examples of other monster groups. The main aim of the talk is to explain how to use quantitative methods (in the context of K-theory) to prove the classical Baum—Connes conjecture for a specific class of lacunary hyperbolic groups - along the way we'll give a very brief description of the Baum—Connes conjecture, define lacunary hyperbolicity properly and also discuss the representation theory of such groups in a broader context.	

Forough, Marzieh **Equivariant C(X)-algebras and strongly self-absorbing dynamical systems**	August 9, 2019 11:00-11:50
Strongly self-absorbing C*-algebras are playing a central role in the classification program of C*-algebras. Recently, studying strongly self-absorbing dynamical systems has been initiated by Gabor Szabo. It is tempting to generalize the results concerning strongly self-absorbing C*-algebras to a dynamical set up. In this direction, we study equivariant C(X)-algebras whose all fibers absorb some strongly self-absorbing dynamical system. We generalize a result by Hirshberg, Rordam and Winter on C(X)-algebras whose all fibers absorb some fixed strongly self-absorbing C*-algebras.	

Frączyk, Mikołaj **Co-amenability and intersections of IRS'ses**	August 9, 2019 13:30-14:20
A subgroup H of a countable group G is called co-amenable if the the coset space G/H admits an almost invariant sequence of finite subsets. I will present a few new results on co-amenable IRS'ses, among other things, that they are closed under taking independent intersections. The talk is based on a joint work with Wouter van Limbeek (UIC).	

Gismatullin, Jakub **Metric ultraproduct of groups –simplicity and amenability**	August 8, 2019 14:30-15:20
During my talk I will explain metric ultraproduct construction of groups, equipped with invariant metric. Its importance to group theory became apparent recently and they are intensively studied. I will concentrate, in this context, on simplicity and amenability of metric ultraproducts of groups. I will explain (non)uniform metric amenability and uniform metric simplicity of groups. Examples are: some classes of linear groups over infintie fields with are uniformly metric simple and Higman-Thompson groups, which are not-uniformly metric amenable and IET group. These generalize, respectively, the previously studied notions of uniform amenability and uniform simplicity.	

Kerr, David **Dynamical alternating groups, property Gamma, and inner amenability**	August 8, 2019 9:30-10:20
I will show that the alternating group of a topologically free action of a countably infinite amenable group on the Cantor set has property Gamma (and in particular is inner amenable) and that there are large classes of such groups which are simple, finitely generated, and nonamenable. This is joint work with Robin Tucker-Drob.	

Khukhro, Ana **Geometry of finite quotients**	August 5, 2019 13:30-14:20
The geometric viewpoint has much enriched the study of finitely generated groups. In this talk, we will survey how finite quotients of a given group can be used geometrically to learn more about the group, to construct objects of coarse-geometric interest, and to explore how varied these objects can be.	

Nagnibeda, Tatiana **Spectral theory of groups and group actions**	August 7, 2019 11:00-11:50
We shall discuss spectral properties of Laplacians (or Markov operators of the random walks) on Cayley graphs of finitely generated groups and on a more general class of graphs called Schreier graphs, corresponding to non-free group actions. Our main class of examples are self-similar groups and self-similar actions. In some cases interesting parallels can be explored with the spectral theory of Schroedinger operators on subshifts.	

Nikolov, Nikolay **2D problems in groups**	August 5, 2019 11:00-11:50
In this talk I will report on joint work with A. Kar on a conjecture characterizing groups of geometric dimension 2 (i.e. the fundamental groups of finite aspherical 2-dimensional CW-complexes). We relate it to the D2 Problem of C.T.C. Wall and the Relation Gap problem for group presentations. We verify the pro-p version of the conjecture, as well as its higher dimensional abstract analogues.	

Ozawa, Narutaka **Kazhdan's property (T) and semidefinite programming**	August 9, 2019 14:30-15:20
Kazhdan's property (T) for groups has a number of applications in pure and applied mathematics. It has long been thought that groups with property (T) are rare among the "naturally-occurring" groups, but it may not be so and it may be possible to observe this by extensive computer calculations. After an introduction, I will present a computer assisted (but mathematically rigorous) method of confirming property (T) based on semidefinite programming with some operator algebraic input. I will report the recent result by M. Kaluba, P. Nowak, and me, and the following result by Kaluba, D. Kielak, and P. Nowak. It confirms property (T) of $Aut(F_d)$, $d > 4$, which solves a well-known problem in geometric group theory.	

Peterson, Jesse **Properly proximal groups and their von Neumann algebras**	August 7, 2019 9:30-10:20
We will introduce a class of groups, which we call properly proximal, which includes all nonelementary hyperbolic groups, all nonelementary bi-exact groups, all convergence groups, all lattices in semisimple Lie groups, and is closed under commensurability and taking direct products, but excludes all amenable and even all inner-amenable groups. We will then discuss rigidity results for von Neumann algebras associated to measure-preserving actions of these groups. This is joint work with Remi Boutonnet and Adrian Ioana.	

Pooya, Sanaz **The Baum-Connes assembly map via explicit examples**	August 8, 2019 16:00-16:50
The Baum-Connes conjecture suggests a link between operator algebras and topology/geometry. The link is provided via the so-called assembly map and the conjecture is that this map is an isomorphism of two abelian groups; equivariant K-homology and K-theory of specific objects constructed from a group. It is known that the conjecture holds true for large classes of groups, including a-T-menable groups, however it is still open for linear groups. In this talk, I will provide an alternative proof for bijectivity of the assembly map of certain wreath product groups which are also a-T-menable. This proof employs the topological approach of Davis-Lück instead of the classical KK-picture of Kasparov and makes use of the particular semi direct product structure of wreath products.	

Radulescu, Florin **Transfering unitary representations from PSL(2,R) to PSL(2,Q_p)- an operator algebra approach**	August 8, 2019 11:00-11:50
We use an operator algebra approach in transfering unitary representations in the discrete series of PSL(2,R) to PSL(2,Q_p). This is related to finite Muray von Neumann dimension of the von Neumann algebra obtained by restriction to PSL(2,Z). In the case of infinite dimension, we construct a "double representation" (by left and right multiplication operators) that we relate some operator algebras cohomology groups.	

Sauer, Roman **Profinite invariants of arithmetic groups**	August 9, 2019 9:30-10:20
A group invariant is profinite if it is the same for residually finite groups with the same finite quotients. We discuss the profiniteness of Euler characteristic, l2-Betti numbers and other invariants — with a special emphasis on arithmetic groups. This is based on joint work with Holger Kammeyer, Steffen Kionke and Jean Raimbault.	

Schneider, Friedrich Martin **The Liouville property and random walks on topological groups**	August 8, 2019 13:30-14:20
The talk will revolve around the following extension of work of Kaimanovich--Vershik and Rosenblatt to general (i.e., possibly non-locally compact) topological groups: a second-countable topological group is amenable if and only if it admits a fully supported, regular Borel probability measure with trivial Poisson boundary. This result has non-trivial consequences even for actions of countable discrete groups on countable sets. Combined with Pestov's work on the extreme amenability of the Polish group Aut(Q,<), it provides answers to some recent questions by Kate Juschenko about the Liouville property for the action of Thompson's group F on the set of dyadic rationals. This is joint work with Andreas Thom.	

Tóth, László Márton **Invariant Schreier decorations on unimodular random graphs.**	August 6, 2019 13:30-14:20
It is a nice exercise in combinatorics to show that all finite 2d-regular graphs are Schreier graphs of the free group on d generators. We will consider the analogous question in the world of Benjamini-Schramm convergence of sparse graphs. We show that any 2d-regular unimodular random network can be given an invariant random Schreier structure. Equivalently, every 2d-regular graphing is a local ismorphic image of a graphing coming from a probability measure preserving action of the free goup. Connections to Borel combinatorics, and invariant random subgroups will also be explored.	

Willett, Rufus **Representation stability and topology**	August 5, 2019 16:00-16:50
Vaguely, a group G is stable when any approximate representation can be approximated by an actual representation. I'll discuss the case when 'representation' means 'finite dimensional unitary representation' and approximations happen in the operator norm. A famous example of Voiculescu shows that the rank two free abelian group is not stable. I'll start by explaining how this example is more-or-less equivalent to Bott periodicity in operator K-theory. I'll then use the same idea to give topological-geometric obstructions (following ideas of Gromov-Lawson and others) to give many more examples of non-stable groups.	