$$\text{Groups} \longrightarrow \text{in}$$
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$$\text{Galway} \longrightarrow 2014$$

Groups in Galway 2014 Schedule

All talks will be in the Arts Millenium Building (AM150) of NUI Galway.

Friday 23 May

10.00–10.45	Philippe Elbaz-Vincent
10.45–11.15	Coffee/tea
11.15–12.00	Herbert Gangl
12.15–1.00	Michael Tuite
1.00–3.00	Lunch break
3.00–3.45	Markus Linckelmann
4.00–4.45	Radha Kessar
5.00–7:00	Poster Competition and Reception with refreshments*
7:30–	Conference Dinner

    * in ADB 1020 (Mathematics seminar room on first floor of Áras de Brún)

Saturday 24 May

9.15–10.00	Kevin Hutchinson
10.15–11.00	Grant Lakeland
11.00–11.30	Coffee/tea
11.30–12.15	Jacques Thévenaz

Talk titles and abstracts

(1) Philippe Elbaz-Vincent. *The group $K_8(\mathbb{Z})$ is trivial.* (#)

(2) Herbert Gangl. *On the homology of linear groups over imaginary quadratic fields*

Abstract: Let Γ be the group $\mathrm{GL}_N(\mathcal{O}_D)$, where $\mathcal{O}_D$ is the ring of integers in the imaginary quadratic field with negative discriminant D. In this talk, we discuss the cohomology of Γ for $N = 3, 4$ and for a selection of discriminants: $D \geq -24$ when $N = 3$, and $D = -3, -4$ when $N = 4$. In particular we compute the integral cohomology of Γ up to p-power torsion for small primes p. Our main tool is the polyhedral reduction theory for Γ developed by Ash and Koecher. Our results extend work of Staffeldt, who treated the case $n = 3$, $D = -4$. In future work, we will apply some of these results to the computations with the K-groups $K_4(\mathcal{O}_D)$, when $D = -3, -4$. This is joint work with Paul E. Gunnells, Jonathan Hanke, Achill Schuermann, Mathieu Dutour Sikiric and Dan Yasaki.

(3) Michael Tuite. *A Brief History of Moonshine*

Abstract: It is 35 years since original Conway and Norton published their Monstrous Moonshine Conjectures. In this talk I will review some of the many subsequent related discoveries in the area of vertex operator algebras and conformal field theory.

(4) Markus Linckelmann. *A characterisation of nilpotent blocks*

Abstract: The broader context for this talk is the interplay between the structure theory of finite groups and their p-local structure. The notion of p-local structure has been axiomatised by Puig in the early 1990s, leading to abstract fusion systems. These have been studied by many authors in the last decade, motivated by applications in homotopy theory and modular representation theory. The general theory of fusion systems starts feeding back into modular representation theory. The present talk describes a result in this spirit, generalising a character theoretic result of Isaacs to block algebras. This is joint work with R. Kessar and G. Navarro.

(5) Radha Kessar. *On transitive block fusion systems*

(6) Kevin Hutchinson. *Hilbert's Third Problem and Scissors Congruence Groups*

Abstract: Hilbert's third problem was to find two polyhedra of equal volume neither of which can be subdivided into finitely many pieces and re-assembled to equal the other (we say they are 'scissors-congruent' if this can be done). It was solved in 1900 by Max Dehn, who introduced a new invariant of (scissors-congruence classes of) polyhedra for the purpose. Much later, in 1965, J. P. Sydler showed that volume and Dehn invariant are a complete set of invariants for classes of polyhedra in 3-dimensional Euclidean space. However, the corresponding problems for hyperbolic and spherical space have been much studied in the last thirty years because of their connections with K-theory, motivic cohomology, regulators and polylogarithms, homology of Linear groups and several other topics of current interest. I will give an overview of the history of these questions and discuss some recent related developments.

(7) Grant Lakeland. *Systoles and Dehn surgery for hyperbolic 3-manifolds*

Abstract: Let $G < \mathrm{PSL}(2, \mathbb{C})$ be a finite covolume Kleinian group, and let $M = \mathbb{H}^3/G$. The systole of M is its shortest closed geodesic, and the systole length can be studied via traces of elements of G. In this talk, I'll discuss the relationship between systole length and volume in M, and prove an asymptotic upper bound for systole length in terms of volume when G is non-cocompact. This result is applied to show that given any 3-manifold M and any knot or link L in M, although the volume of the complement $M - L$ is unbounded, the systole length is bounded independent of L. This is joint work with Chris Leininger.

(8) Jacques Thévenaz. *From finite sets to group algebras.* (#)

Abstract: Let X be a finite set. In a joint work with Serge Bouc, we construct a finite-dimensional algebra canonically associated to X and we study its structure. We consider the algebra of the monoid of all relations on X, modulo the ideal generated by the relations factorizing through a set of cardinality strictly smaller than $\mathrm{Card}(X)$, called inessential relations. This quotient is called the essential algebra associated to X. We then define a suitable nilpotent ideal of the essential algebra and describe completely the structure of the corresponding quotient, a product of matrix algebras over suitable group algebras. In particular, we obtain a description of all the simple modules for the essential algebra.