- Ellen Henke (University of Aberdeen)

  Title: Fusion systems

  Abstract: In the study of saturated fusion systems, previously independent developments in local finite group theory, in modular representation theory and in homotopy theory come together. I will give an introduction to the theory and its applications to different parts of pure mathematics. Along the way, I will mention some of my own results.

- Gerhard Hiss (RWTH Aachen University)

  Title: Kay's vision of the maximal subgroups program

  Abstract: This is a survey on the program of classifying the maximal subgroups of the finite simple groups. I will in particular highlight the various contributions of Kay Magaard and his collaborators. More specifically, I will present some results of our joint projects on imprimitive representations.

- Radha Kessar (City University of London)

  Title: On Picard groups of blocks of finite groups

  Abstract: I will present a description (obtained in joint work with Robert Boltje and Markus Linckelmann) of a "large" subgroup of the group of autoequivalences of a p-block of a finite group in terms of p-local data. The subgroup in question is the group of self Morita equivalences induced by bimodules with endopermutation source. In all examples computed so far this subgroup turns out to be the entire group of autoequivalences over a p-local ring.

- Tung Le (University of Pretoria)

  Title: On characters of a Sylow p-subgroups of a Chevalley group $G(p^n)$

  Abstract: Let $G = G(q)$ be a finite group of Lie type defined over $\mathbb{F}_q$, where q is a power of a prime p. Let U be a Sylow p-subgroup of G. If p is good for the Lie type of G, it is well-known that all character degrees of U are powers of q. In general, determining/counting characters of U is still considered as a "wild" problem. I will discuss a method to simplify the parametrizing character problem of U. I then present some joint results with Goodwin, Magaard and Paolini about the parametrization of irreducible characters of U for all primes p, when G is of small rank, including the exceptional types F_4 and E_6.

- Martin Liebeck (Imperial College)

  Title: Fields of character values for finite groups

  Abstract: For an irreducible character χ of a finite group G, denote by $\mathbb{Q}(\chi)$ the field generated over the rationals by the values of χ. I shall discuss some recent results about such fields, focussing on the case where χ has odd degree. In particular, the possible such quadratic extensions are classified, and a connection with the Galois-McKay conjecture will be explained.

- Gunter Malle (TU Kaiserslautern)

  Title: Low-dimensional representations of finite orthogonal groups

  Abstract: The knowledge of the irreducible characters of finite simple groups of small degree is important for many applications. It turns out that in many cases the second smallest non-trivial degrees are of the order of magnitude of the square of the smallest non-trial degrees. This was known to hold for about one half of the finite simple groups. We report on an extension of this to most of the remaining cases. This is joint work with Kay Magaard.

- Ivan Marin (Université de Picardie Jules Verne)

  Title: Artin groups and Hecke algebras

  Abstract: the subject of this talk is to provide an overview of what is known about the image of the Artin groups inside their Hecke algebras. When these are defined over a finite field, this image is a finite group. In type A, that is when the Artin group is the ordinary braid group, this finite group was determined (for generic values of the parameter) in a joint work with Olivier Brunat and Kay Magaard around 2014. Since then, all types have been settled in the thesis of A. Esterle. I will review these results and put the emphasis on the aspects and questions in which Kay was particularly interested.

- Chris Parker (University of Birmingham)

  Title: Fusion systems: a computational approach

  Abstract: TBA

- Colva Roney-Dougal (University of Saint Andrews)

  Title: Polynomial-time proofs that groups are hyperbolic

  Abstract: A finitely-presented group G is hyperbolic if there is a linear bound on the number of relators required to prove that a word of length n is equal to the identity in G. The word problem in a group that is known to be hyperbolic is solvable in linear time. However, it is undecidable in general whether a group is, in fact, hyperbolic.

  This talk will present some efficient, low-degree polynomial-time procedures which seek to prove that a given finitely-presented group is hyperbolic. If successful, they can also often construct, in low-degree polynomial time, a linear time word problem solver and a quadratic time conjugacy problem solver.

  This is joint work with Derek Holt, Steve Linton, Max Neunhoffer, Richard Parker and Markus Pfeiffer.

- Sergey Shpectorov (University of Birmingham)

  Title: My work with Kay on Hurwitz spaces

  Abstract: While working on the Guralnick-Thompson conjecture, Kay became interested in the general inverse Galois problem and he began collaborating with Helmut Voelklein. Later Kay involved me as well, initially simply as a programmer, to create a GAP package computing braid orbits on the generating tuples in finite groups. Such orbits distinguish connected components of the Hurwitz space, the moduli space of holomorphic maps between curves. In the talk I will review the key results that came out of this collaboration as well as more recent results.

- Gernot Stroth (Universitaet Halle Wittenberg)

  Title: The local structure theorem: the wreath product case

  Abstract: In this talk we will sketch a possible classification of the simple groups in the so called E-uniqueness case, based on the local structure theorem. This is part of the MSS program. In particular we will discuss the wreath product case, which plays a special role in this classification.

- Donna Testerman (Ecole Polytecgnique Federale de Lausanne)

  Title: Restrictions of irreducible representations of simple algebraic groups to certain maximal subgroups

  Abstract : Let G be a simple algebraic group, V an irreducible tensor indecomposable rational G module, and H a maximal closed connected subgroup of G. We investigate the restriction of V to H and for certain choices of H determine all such V having at most two H composition factors; this includes work of Seitz, Testerman, Ford, Ghandour, Burness-Ghandour-Marion-Testerman, Cavallin and Scheinmann.

  Recent work of Scheinmann treats completely the embedding of F_4 in E_6 and introduces an interesting new method which should be useful for other questions in the representation theory of G. A discussion of his work will be the main focus of the talk.

- Rebecca Waldecker (MLU Halle-Wittenberg)

  Title: Groups acting with low fixity: Status and plans

  Abstract: In 2012 Kay Magaard and I started analysing transitive permutation groups that act with low fixity, motivated by Riemann surfaces and their automorphisms. In this talk I will give some insight into what has happend since 2012, including recent work with Barbara Baumeister and Patrick Salfeld. What are our results? What is still open? What can we do next?

- Robert Wilson (Queen Mary University of London)

  Title: Algebra in the real world

  Abstract: The symmetry groups of spacetime in quantum mechanics and general relativity are inconsistent with each other. Physicists do not know what to do about it, but the one thing they have apparently never considered doing is asking group-theorists to sort it out. This may be one reason why there has been no externally observable progress in the theory of fundamental physics since the 1970s.

  By going back to basics, I show that the original error was made in the 1920s, and has never been corrected. Progress for the next 50 years consisted mainly of piling one error on top of another until it reached a point that no further progress was possible. By now, progress can only be made by demolishing the entire edifice and starting again from scratch. I shall describe the first few steps along this road, using

corrected group homomorphisms and corrected representation theory to explain how the universe is much simpler than physicists believe.