Titles and Abstracts.

Itaï Ben-Yaacov (Université Claude Bernard - Lyon 1). *A local approach to globally valued fields.*

ABSTRACT. The globally valued field (GVF) project is a joint work with E. Hrushovski, and has been going on for some time. Its aim is to understand, model-theoretically, global fields such as number fields and function fields, as well as non-standards variants thereof. In it there are two main approaches:
- The "global approach" codes entire GVFs, as well as extensions of GVFs, using the technology of intersection theory.
- The "local approach" attempts to reduce global questions to local one, namely in the context of a valued field in the usual sense, keeping global considerations as simple as possible.

I shall talk about the current state of the second approach.

Alessandro Berarducci (Universitá di Pisa). *Compact domination, o-minimal homotopy and Pillays conjectures.* (Joint with Alessandro Achille.)

ABSTRACT. Classical results of Vietoris (1927), Begle (1950), Smale (1950) and Dugundji (1969) allow to compare the homotopy of two topological spaces X and Y whenever a map $f : X \to Y$ with sufficiently trivial fibers is given (acyclic, contractible, etc.). We apply similar techniques to compare the (o-minimal) homotopy of a group G definable in an o-minimal expansion of a field with the homotopy of the real Lie group G/G^{00} canonically associated to G (by the work of Berarducci, Otero, Peterzil, Pillay and Hrushovski). When G is definably compact we show that the n-th homotopy group of an open subset of G/G^{00} coincide with the n-th homotopy groups of its preimage in G. This was so far known only in the case $n = 1$ or when the open subset coincides with G/G^{00} itself. As an application we obtain a new proof of Pillay's conjectures (the equality of dimension of G and G/G^{00}) and of a result of Edmundo and Otero concerning the structure of the torsion subgroup of G. Joint work with Alessandro Achille.

Alex Berenstein (Universidad de los Andes). *Supersimple theories expanded with a predicate for a forking independent subset.* (Joint with Evgueni Vassiliev and Juan Felipe Carmona.)

ABSTRACT. We study expansions of models of a supersimple theory with a new predicate of forking-independent elements that are dense inside a type G, we call such expansions H-structures associated to G. We show that any two such expansions have the same theory and that under some technical conditions, the saturated models of this common theory are again H-structures associated to G. We prove that under these assumptions the expansion is supersimple and characterize forking and canonical bases of types in the expansion.

Artem Chernikov (University of California - Los Angeles). *Combinatorial properties of forking in some NTP2 theories.*

ABSTRACT. TBA

Annalisa Conversano (Massey University). *Definability, Lie groups, and o-minimality.*

ABSTRACT. y a theorem of Pillay every group definable in an o-minimal structure

M admits a definable topology making it a topological group locally definably homeomorphic to M^n, where n coincides with the o-minimal dimension of the group as a definable set. Therefore, because of Glason's and Montgomery-Zippin's positive solution to Hilberts 5th problem, every group definable in an o-minimal structure over the reals is a finite-dimensional Lie group. We will consider a few more analogies between real Lie groups and groups definable in o-minimal structures, presenting some recent results on definable groups, and discussing the definability of Lie groups in o-minimal and other NIP structures.

Itay Kaplan (Hebrew University of Jerusalem). *Dp-minimal omega-categorical groups are nilpotent-by-finite.* (Joint work with Elad Levi and Pierre Simon.)
ABSTRACT. Baur, Cherlin, and Macintyre as well as Felgner proved that stable omega-categorical groups are nilpotent-by-finite. This was later generalized by Macpherson to NSOP. Krupinski and Krupinski with Dobrowolski (in two separate works, one with NIP, the other without) replaced the stability assumption by the much weaker assumption of being generically-stable. We go to the other direction, and try to generalize Krupinski's first result (NIP omega-categorical groups with fsg are nilpotent-by-finite) to remove the fsg assumption. We succeed in the simplest NIP case, i.e., when the group is dp-minimal.

I will try to give a full proof of this result. All concepts will be defined during the talk.

Alexei Kolesnikov (Towson University). *Hurewicz correspondence revisited.* (Joint with John Goodrick and Byunghan Kim.)
ABSTRACT. This talk will discuss the study of the type amalgamation properties in first-order theories by means of certain homology groups of types (the relevant definitions will be given in the talk). The main focus of the talk will be on the theorem saying that if T is stable and n is the smallest natural number such that the n-th homology group of a strong type p is non-trivial, then the n-th homology group of p is isomorphic to the automorphism group of a specific part of the algebraic closure of n independent realizations of p. A by-product of the analysis is the conclusion that the automorphism group must be abelian.

Chris Laskowski (University of Maryland). *Henkin constructions of models of size continuum.* (Joint work with John Baldwin).
ABSTRACT. A recurring theme in many of Shelah's works is to use a variant of the Henkin argument to build customized models of size continuum from finite approximations in omega steps. This method is intimately related to a notion of indiscernibility, which we dub 'asymptotic similarity.' We will present a streamlined version of these constructions and then demonstrate how variations of it are used to prove Shelah's 2-cardinal theorem, existence of large squares, the existence of atomic models of size continuum in various theories, and give an alternate treatment of a construction of Ackerman-Freer-Patel.

Maryanthe Malliaris (University of Chicago) *Complexity of simple theories.*
ABSTRACT. I will report on an emerging picture of simple theories as seen through the lens of Keisler's order.

Rahim Moosa (University of Waterloo). *An application of model theory to Hopf Ore extensions.* (Joint work with Jason Bell and Omar Leon Sanchez.)

ABSTRACT. An old problem in noncommutative algebra is the Dixmier-Moeglin equivalence for finitely generated associative algebras over a field, which asks whether for a prime (two-sided) ideal the properties of being locally closed, primitive and rational are equivalent. The equivalence is known to hold in several important classes of algebras. It is also known to be false in general, even in finite Gelfand-Kirillov dimension where a counterexample was constructed a couple of years ago using the model theory of Manin kernels. The case of Hopf algebras of finite Gelfand-Kirillov dimension remains open. In this talk I will report on work-in-progress that applies further techniques from the model theory of differentially closed fields to answer the question positively for a Hopf Ore extension of a commutative algebra. The main model-theoretic input is that types in differential algebraic groups of finite dimension over the constants are analysable in the constants. This is joint work with Jason Bell and Omar Leon Sanchez.

Ludomir Newelski (University of Wrocław). *Functions as types, types as functions.*

ABSTRACT. I will discuss a general set-up for topological dynamics, with particular relevance to model theory. Then I will discuss strongly generic sets, both in the stable and general unstable context.

Ya'acov Peterzil (University of Haifa) . *The real shadow of a definably compact homogeneous space.* (Joint with G. Jagiella.)

ABSTRACT.

The Pillay Conjecture (now a theorem) associates to every definably compact group G in an o-minimal structure a compact real Lie group H of the same dimension, that is obtained as a the quotient of G by a minimal type definable subgroup of bounded index (endowed with the logic topology). We may think of H as "the real shadow of G".

Assume now that X is a definably compact G-homogeneous space, namely X admits a definable, continuous transitive (and we may assume faithful) action of a definable group G, not assumed to be definably compact. Then there are:

1. A compact real manifold Y obtained as the quotient of X by a type-definable equivalence relation of bounded index;

2. A real Lie group H, dim H =dim G, obtained as the quotient of a LOCALLY definable subgroup G1 of G, by a type definable subgroup of bounded index. H acts on Y transitively and faithfully;

such that the actions of G1 on X and of H on Y commute.

The pair (H,Y) can be viewed as the real shadow of (G,X).

In particular, the above result allows us to associate a "real shadow" to any definable group which does not contain a normal torsion free definable subgroup.

Charles Steinhorn (Vassar College). *Beyond asymptotic classes and measurable structures.*

ABSTRACT. Macpherson and I, together with several of Macpherson's students, initiated the study of asymptotic classes of finite structures and measurable structures

in an effort to develop a model theory for classes of finite structures that reflects contemporary infinite model theoretic themes. In this talk, we first review some of this work. Then we introduce current research that generalizes these concepts to what we call multidimensional asymptotic classes and generalized measurable structures. This most recent work is joint with Macpherson, S. Anscombe, and D. D. Wolf.

Katrin Tent (University of Münster). *Building-like geometries of finite Morley Rank.*

ABSTRACT. For any $n \geq 5$ we construct almost strongly minimal geometries of type $\bullet \overset{n}{-} \bullet \overset{n}{-} \bullet$ which are 2-ample but not 3-ample.

Lou van den Dries (University of Illinois - Urbana/Champaign). *Definability in the realm of transseries.* (Joint work with M. Aschenbrenner and J. van der Hoeven.)

ABSTRACT. I will briefly summarize the basic elimination theory for the differential field T of transseries, and next discuss some consequences for definability: a rough dimension theory for definable sets, with dimension 0 being the same as discrete, and some results on definably closed subfields of T. This includes open problems and some negative results.

Frank Wagner (Université Claude Bernard - Lyon 1). *Almost invariant families*

ABSTRACT. A theorem of Schlichting says that if G is a group and H a subgroup which is uniformly commensurable with all its G-conjugates, then there is a normal subgroup N of G commensurable with H. This was generalized by Bergmann and Lenstra to subsets (with uniformly finite symmetric difference), and by myself to subspaces of a vector space (with uniformy finite codimension). In this talk I shall present a version for type-definable objects in classical logic, and definable objects in continuous logic.

Boris Zilber (University of Oxford). *On the semantics of algebraic quantum mechanics and the role of model theory.*

ABSTRACT. I will talk about the methods and results of my recent paper "The semantics of the canonical commutation relation" (`http://arxiv.org/abs/1604.07745`). The particular emphasis in this talk will be on how the model-theoretic approach is leading to a novel interpretation of quantum mechanics.