New Forking Festival

Workshop on Generalized Stability Theory and Independence Relations

University of Notre Dame • 28–31 July 2026

Schedule (draft)

Time	**Tue, 28 Jul**	**Wed, 29 Jul**	**Thu, 30 Jul**	**Fri, 31 Jul**
09:30–10:30	*Registration*	Pillay	Baldwin (online)	Mutchnik
10:30–11:00	*Coffee*	*Coffee*	*Coffee*	*Coffee*
11:00–12:00	Kruckman	Burka	Kim	d'Elbée
12:00–14:00	*Lunch*	*Lunch*	*Lunch*	*Lunch / farewell*
14:00–15:00	Conant	Kaplan	Miguel Gómez	—
15:00–15:30	*Coffee*	*Coffee*	*Coffee*	—
15:30–16:30	Takahashi	Hanson	*Problem session*	—
16:30–17:30	—	—		—
19:00	—	—	*Conference party*	—

Note. This is a working draft. Speaker assignments to days and time slots are tentative and will be revised.

Venue. Department of Mathematics, University of Notre Dame. Hayes-Healy 127
Website. https://nickramsey621.github.io/conference.html
Contact. Nicholas Ramsey, sramsey5@nd.edu

Conference party. Thursday, 30 July, from 19:00, chez Ramsey–Gupta — about a half-hour walk from the math building; the address will be circulated to participants. Nick can drive up to four people over a few hours before the party; riders will be put to work on party prep.

Titles and Abstracts

Listed alphabetically by surname.

John Baldwin *University of Illinois Chicago*

A half century plus of model theory

I will survey the development of model theory and its relation to mathematics at large over the last half century plus. I will begin with the situation around 1970 and through the 70's with special reference to the forking festivals and their namesake forking festival. I will note a few of the trends in model theory over more than half a century: touching on such as, east vs west coast model theory, geometric stability, the rise and fall and resurrection of infinitary logic, and neo-stability. I will point to a few problems that have remained open for much of that time and perhaps to some of my recent work.

Alex Burka *UC Berkeley*

On approximate classification of theories.

We develop a framework for model-theoretic classification theory in an approximate first-order setting and discuss some related open problems.

Gabriel Conant *University of Illinois Chicago*

Generic stability and randomizations

I will discuss recent joint work with Gannon and Hanson exploring several competing notions of generic stability for Keisler measures. Along the way, we will see some unexpected connections among them and what these connections suggest about the behavior of generic stability under Morley products.

Christian d'Elbée *Universidad del País Vasco/Euskal Herriko Unibertsitatea*

On Shirshov's amalgamated free product and generic nilpotent groups

In this talk, we will present recent joint work with Müller, Ramsey and Siniora. In previous work, we gave a construction and description of an amalgamated free product of filtered Lie algebra within a fixed nilpotency class, based on an intricate induction rooted in the work of Maier and Higman. I will present a new description of this amalgam adopting the viewpoint and methods from the work of Shirshov on amalgamation of Lie algebras, simplifying substantially our previous approach. This new description yields a group-theoretic application. A c-nilpotent group is called UL-equivalent if its lower and upper central series coincide. Answering a question of A. Ivanov and Majcher, we prove that every finite c-nilpotent group of prime exponent p with $p > c$ embeds in a finite UL-equivalent c-nilpotent group of exponent p. We will also describe descriptive set theoretic consequences of this fact.

James Hanson *Iowa State University*

Small large cardinals and neostability theory

Neostability theory is the branch of model theory that studies certain classes of combinatorially tame first-order theories and more generally local combinatorial tameness within arbitrary theories. These tameness notions are often intimately linked to the behavior of indiscernible sequences. We will discuss some recent applications of certain small large cardinals (between ineffable and Erdős) in model-theoretic neostability theory and in particular their use in building certain special indiscernible sequences.

Itay Kaplan *Hebrew University of Jerusalem*

Existence over a predicate

Joint project with Martin Bays and Pierre Simon. Suppose that L contains a predicate symbol P and that T is some complete theory such that P is stably embedded. We give a sufficient condition that implies existence: any model of the induced theory T^P is the P part of a model of T and give some examples where existence fails.

Joonhee Kim *Korea Institute for Advanced Study*

n-variable theorems for dividing lines characterized by positive consistency-inconsistency configurations

We define a class of classes of first-order theories, which is called $\mathfrak{D}_{n\text{-var}}$, in terms of positive consistency-inconsistency configuration and generalized indiscernibles. $\mathfrak{D}_{n\text{-var}}$ contains the class of stable theories, the class of simple theories, the class of NIP theories, the class of NTP_1 theories, the class of NTP_2 theories, the class of NATP theories, the class of NCTP theories, the class of NBTP theories, the class of NSOP_3 theories, the class of theories not having $(k,1,1)$-weave of depth ω for all $k<\omega$, the class of theories not having infinite k-grid for all $k<\omega$, and the class of $\mathrm{NPM}^{(k)}$ theories, for each $k<\omega$.

We show that for any dividing line $D \in \mathfrak{D}_{n\text{-var}}$ and any first-order theory $T \notin D$, we can always find a formula witnessing $T \notin D$ such that the length of the free variable part and the algebraic dimension of the free variable part are the same. We call statements of this form n-variable theorems. It can be regarded as a weak version of one-variable theorem, and by using this, we show that for any $D \in \mathfrak{D}_{n\text{-var}}$ and a theory T,

(i) $T \in D$ if and only if $T^{gt} \in D$,

(ii) $T \in D$ if and only if $T_P \in D$,

(iii) $T \in D$ if and only if $T^{ind} \in D$,

(iv) $T \in D$ if and only if $T_K^{\mathrm{G}} \in D$,

(v) $T \in D$ if and only if $\mathrm{ACF}_T \in D$,

(vi) $T \in D$ if and only if $T_g^{\delta} \in D$,

where T^{gt}, T_P, T^{ind}, T_K^{G}, ACF_T, and T_g^{δ} are the theory of the generic trivialization of T, the theory of lovely pair expansion of T, the theory of H-structure expansion of T, the theory of vector space with a dense-codense generic K-subspace, the theory of algebraically closed field with the distinguished subfield, and the theory of generic derivations of algebraically bounded field, respectively.

We also introduce a larger class $\mathfrak{D}^h_{n\text{-var}} \supseteq \mathfrak{D}_{n\text{-var}}$, which captures some higher-arity dividing lines such as NIP_k for every $k<\omega$. We show that n-variable theorem still holds for every dividing line in $\mathfrak{D}^h_{n\text{-var}}$.

Alex Kruckman *Wesleyan University*

Structural Ramsey theory via presheaves and ultrafilters

A class K of finite structures is said to have the Ramsey Property (RP) if it satisfies a natural generalization of the classical finite Ramsey theorem. RP can be easily phrased as a property of the category of structures in K and embeddings between them, so it makes sense for any category C. Under mild hypotheses on C, I will prove a natural categorical equivalent to RP: every presheaf P on C admits a "global ultrafilter". An equivalent formulation is that every contravariant functor from C to the category of compact Hausdorff spaces has a global element (a kind of fixed-point). As an application, we obtain a new proof of the celebrated Kechris–Pestov–Todorčević theorem characterizing extreme amenability of automorphism groups of countable structures in terms of RP. Since this is a talk at the New Forking Festival, I will also speculate on whether all this has anything to do with forking, via notions of Morley sequence for generalized indiscernibles. All the necessary concepts from Ramsey theory and category theory will be explained from scratch in the talk.

Alberto Miguel Gómez *University of Cambridge*

Generalising Kim's lemma to abstract independence relations

Recent developments in neostability theory have witnessed the proliferation of versions of Kim's lemma used to characterise ever-wider classes of unstable first-order theories, including NTP_2, NSOP_1, NSOP_4, NBTP, and beyond. These results highlight some limitations of Adler's framework for the study of abstract independence relations and suggest that new tools are at play underneath this diversity. In this talk, I will extend Adler's framework to study Kim's lemma and its consequences in their full generality. Specifically, I will reinterpret Kim's lemma as a binary relation between independence relations under minimal assumptions. Time permitting, I will exemplify how this generalises several results from the literature, offer some new results that this framework proves, and mention previously known theorems which can be obtained in a semantic fashion using this technology.

Scott Mutchnik *University of Illinois Chicago*

What can the forking community learn from the real strict order property hierarchy?

A main reason for forking's success as a research program within classification theory has been its applicability to theories that are not stable, and that may not even be simple. These include NSOP_n theories for integer values of n, especially the NSOP_1 and NSOP_2 theories of Džamonja and Shelah, as well as NSOP_3 theories and $\mathrm{NSOP}_{2^{n+1}(+1)}$ theories from Shelah's hierarchy. On the other hand, the NSOP_n hierarchy for *non-integer* values of n initially appears to be of more independent interest.

By contrast, our goal in this talk will be to demonstrate that a full understanding of the classification-theoretic properties relevant to forking, including Shelah's NTP_2 and the NSOP_n hierarchy for integer values of n, will be incomplete without first understanding NSOP_r theories for non-integer values of r. We will first briefly review why NTP_2 and NSOP_n for integer-valued n are so important for forking. We will then summarize the current state of our knowledge on the theory of the properties NSOP_r for real values of r, particularly the open problem of whether any of these properties are new. Our talk will concentrate on three different applications of this real-valued NSOP_r hierarchy.

First, we will discuss how the properties NSOP_r for real values of r, previously defined for $r \geq 3$, are even well-defined in the exact same way when $3 > r > 2$. Our proof uses the result that $\mathrm{NSOP}_1 = \mathrm{NSOP}_2$, as well as Kaplan and Ramsey's theory of Kim-forking in NSOP_1 theories. As a consequence, we get a direct connection between the question of whether NSOP_2 is equal to NSOP_3, and the question of whether all of the well-defined properties NSOP_r for real-valued r are new.

Second, we describe an approximate dichotomy between two possibilities with very different motivations: (1) that the real-valued NSOP_r hierarchy really does introduce new classification-theoretic properties, and (2) that $\mathrm{NTP}_2 \cap \mathrm{NSOP}_{n+1}$ is equal to $\mathrm{NTP}_2 \cap \mathrm{NSOP}_n$ for integers $n \geq 3$, resolving a classical open problem. Specifically, we give a rigorous sense in which (1) can fail for more general reasons; if (1) is false for these general reasons, then we can show that (2) must be true.

Finally, we discuss our most technically difficult application given existing knowledge, where we make progress on the problem of whether NSOP_2 is equal to NSOP_3. We reveal a fundamental combinatorial tension between these two properties, namely that for $\mathcal{H}$ a hereditary class defined by finitely many forbidden weak substructures, if every theory whose models have age $\mathcal{H}$ has SOP_2, then every theory whose models have age $\mathcal{H}$ has SOP_3. Importantly, this is not true replacing "SOP_2" with "non-simple". As a consequence of preservation results of Bodirsky, Bodor and Marimon, our result reduces to what initially superficially appeared to be a mere verification for a specific family of theories: the theories of generic structures of Cherlin, Shelah and Shi. Performing this verification will require us to apply arguments from the theory of the real-valued NSOP_r hierarchy in a much more careful way.

Anand Pillay *University of Notre Dame*

Around categoricity and stability over a predicate

Yuki Takahashi *UC Berkeley*

Dependent dividing and subadditivity of burden

We discuss Chernikov's conjecture that the burden is sub-additive. As partial progress toward this conjecture, we show that if T has a stronger version of dependent dividing (where dividing is witnessed by a formula in an existentially NIP reduct T_0 of T), then the burden agrees with the dp-rank witnessed by NIP formulas in T_0 and is thus sub-additive for types over the empty set.