BLAST 2015 @ UNT

University of North Texas
June 8 - 12, 2015

Schedule of Talks

Monday, June 8, 2015

8:00am - 8:30am	**Coffee social**
8:30am - 9:20am	**Alan Dow** (Invited speaker) UNC Charlotte *A new topological application of Todorcevic's PFA(S) principle*
9:40am - 10:30am	**Dilip Raghavan** (Invited speaker) National University of Singapore *Cardinal invariants of density*
10:50am - 11:50am	**Sławomir Solecki** (Tutorial) University of Illinois at Urbana-Champaign *Ultrafilter space methods in Infinite Ramsey Theory I*
11:50am - 1:30pm	**Lunch break**
1:30pm - 2:30pm	**Agata Ciabattoni** (Tutorial) Vienna University of Technology *Proof theory meets semantics: the case of substructural logics I*
3:00pm - 3:20pm	**John Clemens** (Special session) Southern Illinois University *Relative primeness of equivalence relations*
3:30pm - 3:50pm	**Joseph Zielinksi** (Special session) University of Illinois at Chicago *The complexity of the homeomorphism relation between compact metric spaces*
4:00pm - 4:20pm	**Joseph Van Name** (Special session) University of South Florida *Boolean-valued point-free topology*
4:30pm - 4:50pm	**Toshimuchi Usuba** (Special session) Kobe University *Long Cut and Choose games of the infinite distributive law*
5:00pm - 7:00pm	**Wine and cheese reception**

Tuesday, June 9, 2015

8:00am - 8:30am	**Coffee social**

8:30am - 9:20am	**Hiroshi Sakai** (Invited speaker) Kobe University *Stationary reflection principles and two cardinal tree properties*
9:40am - 10:30am	**Grigor Sargsyan** (Invited speaker) Rutgers University *TBA*
10:50am - 11:50am	**Sławomir Solecki** (Tutorial) University of Illinois at Urbana-Champaign *Ultrafilter space methods in Infinite Ramsey Theory II*
11:50am - 1:30pm	**Lunch break**
1:30pm - 2:30pm	**Agata Ciabattoni** (Tutorial) Vienna University of Technology *Proof theory meets semantics: the case of substructural logics II*
3:00pm - 3:20pm	**Lynn Scow** (Special session) Vassar College *Transfer of the Ramsey Property between Classes*
3:30pm - 3:50pm	**Natasha Dobrinen** (Special session) University of Denver *Continuous and other finitely generated canonical cofinal maps on ultrafilters*
4:00pm - 4:20pm	**Gabriel Conant** (Special session) University of Illinois at Chicago *Extending isometries in generalized metric spaces*
4:30pm - 4:50pm	**William DeMeo** (Special session) Iowa State University *On the tractability of constraint satisfaction problems of commutative idempotent binars*

Wednesday, June 10, 2015

8:00am - 8:30am	**Coffee social**
8:30am - 9:20am	**Michael Hrušák** (Invited speaker) Instituto de matematicas, UNAM, Mexico *Uniform properties of metric spaces*
9:40am - 10:40am	**James Cummings** (Tutorial) Carnegie-Mellon University *Prikry forcing and generalisations I*

11:00am - 12:00am	**Ralph McKenzie** (Tutorial) Vanderbilt University *Maltsev conditions, locally finite and not–and the magic in finitely related idempotent algebras I*
12:00am - 1:30pm	**Lunch break**
1:30pm - 9:00pm	**Excursion and dinner**

Thursday, June 11, 2015

8:00am - 8:30am	**Coffee social**
8:30am - 9:20am	**Clifford Bergman** (Invited speaker) Iowa State University *TBA*
9:40am - 10:30am	**Peter Jipsen** (Invited speaker) Chapman University *Generalized effect algebras as models of concurrent resources*
10:50am - 11:50am	**James Cummings** (Tutorial) Carnegie-Mellon University *Prikry forcing and generalisations II*
11:50am - 1:30pm	**Lunch break**
1:30pm - 2:30pm	**Ralph McKenzie** (Tutorial) Vanderbilt University *Maltsev conditions, locally finite and not–and the magic in finitely related idempotent algebras II*
3:00pm - 3:20pm	**Nam Trang** (Special session) Carnegie-Mellon University *On canonical models of determinacy and ω_1 is $\mathbb{R}$-supercompact*
3:30pm - 3:50pm	**Diana Ojeda-Aristizábal** (Special session) University of Toronto *Finite forms of Gowers' FIN_k theorem*
4:00pm - 4:20pm	**Matthew Moore** (Special session) Vanderbilt University *Absorption and directed Jonsson terms*
4:30pm - 4:50pm	**Alex Kruckman** (Special session) University of California at Berkeley *Properly ergodic random structures*

Friday, June 12, 2015

8:00am - 8:30am	**Coffee social**

8:30am - 9:20am	**A. Kwiatkowska** (Invited speaker) University of California at Los Angeles *TBA*
9:50am - 10:10am	**David Chodounsky** (Special session) Institute of Mathematics of the Czech Academy of Sciences *Y-c.c. and Y-proper forcing*
10:20am - 10:40am	**Brent Cody** (Special session) Virginia Commonwealth University *Large cardinal-like embedding properties below the continuum*
10:50am - 11:10am	**Scott Cramer** (Special session) Rutgers University *Tree representations from very large cardinals*
11:20am - 11:40am	**Riquelmi Cardona** (Special session) University of Denver *The FEP for some noncommutative varieties of fully-distributive knotted residuated lattices*
11:40am - 1:30pm	**Lunch break**
1:30pm - 1:50pm	**Andrew Zucker** (Special session) Carnegie-Mellon University *The Samuel compactification of an automorphism group: some open questions*
2:00pm - 2:20pm	**Xin Ma** (Special session) Texas A&M University *Schauder equivalence relations*
2:30pm - 2:50pm	**Lawrence Valby** (Special session) University of California at Berkeley *$\downarrow$-posets*
3:00pm - 3:20pm	**Revantha Ramanayake** (Special session) Vienna University of Technology *Between axioms and structural rules in the display calculus*
3:30pm - 3:50pm	**P. Nandakumar** (Special session) Perunthalaivar Kamarajar Institute of Engineering and Technology *On fuzzy prime ideals of lattices*

Abstracts of invited talks

Clifford Bergman, *TBA.* Iowa State University. cbergman@iastate.edu

Alan Dow, *A new topological application of Todorcevic's PFA(S) principle.* University of North Carolina at Charlotte. adow@uncc.edu

Larson and Todorcevic introduced the Souslin's Axiom principle in solving the classical Katetov problem about the metrizability of any compact space whose square is hN (hereditarily normal). Soon after, Todorcevic introduced the strengthening denoted PFA(S) which asserts that there is a "coherent" Souslin tree S and that for any proper poset $\mathbb{P}$ that preserves S, the standard $\mathrm{MA}_{\mathbb{P}}$ holds for $\mathbb{P}$. The interesting applications of PFA(S) are found by discovering what properties hold in the forcing extension by S. We review some of the known results needed for our application, as well as sketch a new PFA type consequence concerning forcing copies of the countable ordinals. The main result is the consistency of the statement that each hN manifold of dimension greater than 1 is metrizable. This is joint work with Frank Tall.

Michael Hrušák, *Uniform properties of metric spaces.* Instituto de matematicas, UNAM, Mexico. michael@matmor.unam.mx

We shall consider several uniform properties of metric spaces and Polish groups, and investigate related cardinal invariants. In particular, we shall study strong measure zero sets and possible extensions of the Galvin-Mycielski-Solovay theorem.

Peter Jipsen, *Generalized effect algebras as models of concurrent resources.* Chapman University. jipsen@chapman.edu

Partial commutative monoids and several of its subquasivarieties have long been used as algebraic models of quantum logic. Here we review some of these models, including effect algebras, orthoalgebras, orthomodular posets and some of their generalizations. A *partial commutative monoid* is a partial algebra of the form $(A, +, 0)$ where $x + 0 = x$ and $+$ is an associative commutative partial operation, which means that if one side of the associative/commutative identities is defined, so is the other, and then both sides are equal. It is a *generalized effect algebra* if $+$ is *cancellative* ($x + z = y + z$ implies $x = y$) and *positive* ($x + y = 0$ implies $x = 0$). An *effect algebra* in addition has a unary operation $'$, called an *orthosupplement*, and a constant 1 such that $x' + x = 1$. A *generalized orthoalgebra* is a generalized effect algebra that satisfies $x + x = y \Rightarrow x = 0$, and an *orthoalgebra* is an effect algebra that satisfies this quasiequation.

Based on a concrete model of the memory heap in a computer, we introduce heap partial algebras and show how they are related to generalized orthoalgebras. We prove that every heap partial algebra is a subalgebra of a power of the two-element partial monoid, and we present some quasiequations that hold in all heap partial algebra but not in all generalized orthoalgebras. We also consider the question whether the two-element partial monoid is dualizable.

Heap partial algebras are applied to the modeling of concurrent resources, where the addition of two resources is only defined if the resources do not overlap. The

state space of a concurrent computation is an example of this situation, and a set of states is interpreted as a logical test in a program. Hence complex algebras of heap partial algebras are an appropriate setting for concurrent models of computation. This leads to new subvarieties of bunched implication algebras and concurrent Kleene algebras with tests.

Aleksandra Kwiatkowska, *TBA.* University of California at Los Angeles. akwiatk@ucla.edu

Dilip Raghavan, *Cardinal invariants of density.* National University of Singapore. dilip.raghavan@protonmail.com

I will talk about some recent work on cardinal invariants associated with the ideal $\mathcal{Z}_0$ of sets of asymptotic density 0. In particular I will discuss some upper bounds for $\mathrm{cov}^*(\mathcal{Z}_0)$, which is the minimal number of density 0 sets needed to intersect every infinite subset of ω on an infinite set. This dualizes to give a lower bound for $\mathrm{non}^*(\mathcal{Z}_0)$.

Hiroshi Sakai, *Stationary reflection principles and two cardinal tree properties.* Kobe University. hsakai@people.kobe-u.ac.jp

In Set Theory, various kinds of stationary reflection principles have been studied so far. In this talk we will focus on the Weak Refleciton Princple, WRP, and the Semi-Stationary Reflection Principle, SSR.

We will observe that the relationship between WRP and SSR is somewhat similar as that between supercompact cardinals and strongly compact cardinals. Among other things, under Martin's Axiom, WRP and SSR respectively imply ITP and TP at ω_2, where ITP and TP are two cardinal tree properties which characterize the supercompactness and strong compactness for inaccessible cardinals.

One of important open problems on ITP and TP is whether they imply the Singular Cardinal Hypothesis. We will also discuss a recent progress on this problem.

Grigor Sargsyan, *TBA.* Rutgers University. grigor@math.rutgers.edu

Abstracts of tutorials

Agata Ciabattoni, *Proof theory meets semantics: the case of substructural logics.* Vienna University of Technology. agata@logic.at

I will present some applications of proof theory to the semantics (mainly algebraic) of substructural logics. Substructural logics are axiomatic extensions of full Lambek calculus. They encompass, among many others, classical, intuitionistic, intermediate, fuzzy, and relevant logics. After a brief introduction on the sequent calculus and on some of its generalization, I will describe a method for the uniform and systematic introduction of "good" (i.e. cut-free) Gentzen-style calculi for large classes of substructural logics starting from their Hilbert systems. The method has been developed together with N. Galatos and K. Terui.

In the last part of the tutorial I will show how to use the introduced calculi to prove various semantic results for the formalized logics.

James Cummings, *Prikry forcing and generalisations.* Carnegie-Mellon University. jcumming@legba.math.cmu.edu

Prikry forcing is one of the central forcing constructions in singular cardinal combinatorics. We will start by sketching its main properties and then consider some generalisations: supercompact Prikry forcing, diagonal Prikry forcing, Prikry forcing with interleaved collapses, Radin forcing. The only prerequisites will be a basic knowledge of forcing and large cardinals.

Ralph McKenzie, *Maltsev conditions, locally finite and not–and the magic in finitely related idempotent algebras.* Vanderbilt University.
ralph.n.mckenzie@vanderbilt.edu

I will survey results and some proofs. All of this coming out of the (amazingly successful) application of universal algebra to the constraint satisfaction problem (theoretical computer science, viz. algorithmic complexity) that began about fifteen years ago, and after a few years, was turned on its tail as new perspectives led to a string of remarkable new algebraic results.

Sławomir Solecki, *Ultrafilter space methods in Infinite Ramsey Theory.* University of Illinos at Urbana-Champaign. ssolecki@illinois.edu

The two hour tutorial will concentrate on foundations of a fragment of Ramsey theory. I will describe a general framework for proving Ramsey results involving ultrafilters by introducing new type of algebraic structures.

The framework will involve in a crucial way ultrafilter spaces over partial semigroups. I will phrase and prove a general Ramsey theorem on the existence of appropriately defined basic sequences for such structures. I will illustrate the general notions with one or two concrete examples, for instance, an extension of Furstenberg and Katznelson's generalization of the Hales–Jewett theorem.

Abstracts of special session talks

Riquelmi Cardona, *The FEP for some noncommutative varieties of fully-distributive knotted residuated lattices.* University of Denver. rcardon3@du.edu

A class of algebras K is said to have the finite embeddability property (FEP) if every finite partial subalgebra of an algebra in K can be embedded into a finite algebra in K. A knotted inequality is of the form $x^m \leq x^n$, for m different from n and $m > 0$, n nonnegative. A residuated lattice is called distributive if its lattice reduct is distributive; it is fully distributive if multiplication and join distribute over meet.

We consider noncommutative monoid identities of which the simplest is $xyx = x^2y$ and prove the FEP for varieties of fully distributive residuated lattices that satisfy a knotted inequality (for $m > n$) and one of these noncommutative identities.

The previous result uses the theory of distributive residuated frames developed by Galatos and Jipsen.

Our proof relies on constructing a relatively free semilattice monoid extending a pomonoid. We utilize results from the theory of well quasi-orders and better quasi-orders to show that our free structure is a well partial order.

This is joint work with Nick Galatos.

David Chodounsky, *Y-c.c. and Y-proper forcing.* Institute of Mathematics of the Czech Academy of Sciences. chodounsky@math.cas.cz

I will introduce two new classes of forcing notions, which are intermediate between σ-centered and c.c.c., and strongly proper and proper respectively. Forcings in these classes have nice and interesting properties, including not adding random reals, not adding uncountable anti-cliques in open graphs, the ω_1 approximation property, iterability, and other properties. Many classical forcing notions fall into these newly defined classes. This is a joint work with Jindrich Zapletal.

John Clemens, *Relative primeness of equivalence relations.* Southern Illinois Univsersity. clemens@siu.edu

Let E and F be equivalence relations on the spaces X and Y. We say that E is prime to F if: whenever $\varphi : X \to Y$ is a homomorphism from E to F, there is a continuous embedding ρ from E to itself so that the range of $\varphi \circ \rho$ is contained in a single F class. That is to say, φ is constant (up to F-equivalence) on a set on which E maintains its full complexity with respect to Borel reducibility. I will discuss this notion and show that many non-reducibility results in the theory of Borel equivalence relations can be strengthened to produce primeness results. I will also discuss the possibility of new types of dichotomies involving the notion of primeness.

Brent Cody, *Large cardinal-like embedding properties below the continuum.* Virginia Commonwealth University. bmcody@vcu.edu

This work extends the study of the ways in which small cardinals can resemble large cardinals to include several properties resembling large cardinal embedding properties. Let $\mathrm{TP}(\kappa)$ be the assertion that the tree property holds at κ, and let *the weakly compact embedding property* $\mathrm{EP}_{wc}(\kappa)$ be the assertion that for every transitive set M there is a transitive N and an elementary embedding $j : M \to N$ with critical point κ. The weak compactness of κ can be characterized by asserting either "κ is inaccessible and $\mathrm{TP}(\kappa)$" or "κ is inaccessible and $\mathrm{EP}_{wc}(\kappa)$". Mitchell showed that one can force to collapse cardinals below a weakly compact cardinal κ in such a way that in the forcing extension, $\kappa = \omega_2$ and $\mathrm{TP}(\omega_2)$; in this way, ω_2 can be made to resemble a large cardinal. We prove that, given a weakly compact cardinal κ, by forcing to add κ^+-many Cohen reals one obtains a model in which $\kappa < 2^\omega$ and $\mathrm{EP}_{wc}(\kappa)$ holds; in this way, a cardinal below the continuum can resemble a weakly compact cardinal in a way which is strictly stronger than having the tree property. The weakly compact embedding property $\mathrm{EP}_{wc}(\kappa)$ implies (1) κ is weakly Mahlo, (2) the tree property holds at κ, (3) every stationary subset of κ reflects and (4) the well-known cardinal invariants $\mathfrak{b}, \mathfrak{d}, \mathfrak{a}$, $\mathfrak{c}$, etc. are all not equal to κ. We also

consider additional characterizations of weak compactness without inaccessibility, as well as several other large cardinal embedding properties, such as the *unfoldable embedding property*, and their consequences. This is joint work with Sean Cox, Joel Hamkins and Thomas Johnstone.

Gabriel Conant, *Extending isometries in generalized metric spaces.* University of Illinois at Chicago. gconan2@uic.edu

A class K of finite structures has the Hrushovski property if, for any A in K, there is an extension B in K such that any partial isomorphism of A extends to a total automorphism of B. In the case that K is a Fraisse class, the Hrushovski property can have significant consequences for the automorphism group of the Fraisse limit. This property was shown for the class of finite graphs by Hrushovski, and later for the class of finite metric spaces by Solecki. Viewing graphs as metric spaces with distances in $\{0, 1, 2\}$, we can think of these two results as special cases of the general situation where we fix a totally and positively ordered commutative monoid R, and consider the class of finite metric spaces taking distances in R. In this talk, we present analogs of results of Solecki and Herwig-Lascar in this generalized context. For example, in the case that R is archimedean (as an ordered monoid), a direct generalization of Solecki's work shows that the class of finite R-metric spaces has the Hrushovski property. We also give new results and open questions in the non-archimedean case.

Scott Cramer, *Tree representations from very large cardinals.* Rutgers University. cramer@math.rutgers.edu

We will discuss the propagation of certain tree representations in the presence of very large cardinals. These tree representations give generic absoluteness results and have structural consequences in the area of generalized descriptive set theory. In fact these representations will give us a method for producing models of strong determinacy axioms.

William DeMeo, *On the tractability of constraint satisfaction problems of commutative idempotent binars.* Iowa State University. williamdemeo@gmail.com

A binar is a set equipped with a binary operation. Letting A denote a finite commutative idempotent binar (CIB), and R a set of subuniverses of powers of A, we ask whether the constraint satisfaction problem CSP(R) is solvable in polynomial time. It turns out that if S is the two-element semilattice, then the following are equivalent: (i) S is not a divisor of A; (ii) V(A) omits tame congruence type 5; (iii) A has a Maltsev term. Thus, such CIBs are tractable. We will present this result and then describe a simple four-element CIB not satisfying (i) for which the CSP tractability problem seems open.

This is joint work with Cliff Bergman and Jiali Li.

Natasha Dobrinen, *Continuous and other finitely generated canonical cofinal maps on ultrafilters.* University of Denver. natasha.dobrinen@du.edu

The existence of continuous cofinal maps on ultrafilters plays a crucial role in the development of the structure of Tukey types of p-points. In this talk, we present several classes of ultrafilters for which every monotone cofinal map is canonical when restricted to some base for the ultrafilter. On all ultrafilters Tukey reducible to p-points, we have continuous Tukey reductions; on iterated Fubini products of p-points, we have finitely generated Tukey reductions which are continuous on the tree space; and on ultrafilters Tukey reducible to some Fubini iterate of p-points, we have finitely generated Tukey reductions. These canonical maps are then applied to find connections between Tukey, Rudin-Keisler, and Rudin-Blass reductions on ultrafilters.

Alex Kruckman, *Properly ergodic random structures.* University of California, Berkeley. kruckman@gmail.com

One natural notion of "random L-structure" is a probability measure on the space of L-structures with domain omega which is invariant and ergodic for the natural action of $\mathrm{Sym}(\omega)$ on this space. Such measures arise naturally as limits of sequences of finite structures which are convergent in the appropriate sense, generalizing the graph limits of Lovász and Szegedy. Further, ergodicity tells us that such a measure assigns measure 0 or 1 to any sentence of the infinitary logic $L_{\omega_1,\omega}$, so it makes sense to talk about the theory of a random structure. There is a strong dichotomy between those random structures which are almost surely isomorphic to a given countable structure and those which are not - we call the latter type properly ergodic. We provide a counting types characterization of those sentences of $L_{\omega_1,\omega}$ which admit properly ergodic random models. As corollaries, we prove an analogue of Vaught's conjecture in this context, and we show that the complete $L_{\omega_1,\omega}$-theory of any properly ergodic random structure has no models (of any cardinality).

Matthew Moore, *Absorption and directed Jonsson terms.* Vanderbilt University. notmattmoore@gmail.com

We prove that every congruence distributive variety has directed Jonsson terms, and every congruence modular variety has directed Gumm terms. The directed terms we construct witness every case of absorption witnessed by the original Jonsson or Gumm terms. This result is equivalent to a pair of claims about absorption for admissible preorders in CD and CM varieties, respectively. For finite algebras, these absorption theorems have already seen significant applications, but until now, it was not clear if the theorems hold for general algebras as well. Our method also yields a novel proof of a result by P. Lipparini about the existence a chain of terms (which we call Pixley terms) in varieties that are at the same time congruence distributive and k-permutable for some k.

Pandarinathan Nandakumar, *On fuzzy prime ideals of lattices.* Perunthalaivar Kamarajar Institute of Engineering and Technology. drpnandakumar@gmail.com

The concept of fuzzy sets was introduced by Zadeh[8], Rosenfeld[5] used this concept to formulate the notion of fuzzy groups. Since then many other fuzzy algebraic concepts based on the Rosenfeld's fuzzy groups were developed Yuan and

Wu[7] introduced the concepts of fuzzy sublattices and fuzzy ideals of a lattice. Ajmal and Thomas[4] defined a fuzzy lattice as a fuzzy algebra and characterized fuzzy sublattices. B.B.N. Koguer, C.Nkuimi and C.Lele [3] stud- ied the notion of fuzzy prime ideal and highlight the difference between fuzzy prime ideal and prime fuzzy ideals. In this paper we give a new characteriza- tion of fuzzy prime ideal. Also we have proved that every prime fuzzy ideal is fuzzy prime ideals but the converse need not be true. We have shown that the image set of a non-constant prime fuzzy ideal of lattice L will contain only two elements. Throughout this paper L denotes a Lattice.

References

[1] M. Attallah, Completely fuzzy prime ideals of distributive lattices, The Journal of Fuzzy Mathematics, Los Angeles, Vol.8, No.1, 151-156, 2000.

[2] B. A. Davey and H.A.Priestley, Introduction to Lattices and order, Second Edition Cambridge, 2002.

[3] B.B.N.Koguep,C.Nkuimi,C.Lele, On Fuzzy Prime Ideals of Lat- tices, SJPAM, Vol.3, 1-11, 2008.

[4] Naseem Ajmal and K. V. Thomas, Fuzzy Lattices, Information Sciences 79, 271-291, 1994.

[5] A.Rosenfeld, Fuzzy Groups, J.Math. Anal. Appl.35, 512-517, 1971.

Diana Ojeda-Aristizábal, *Finite forms of Gowers' FIN_k theorem.* University of Toronto. dojeda@math.toronto.edu

Hindmans Theorem states that given any finite coloring of FIN, the collection of finite sets of natural numbers, there exists an infinite sequence of elements of FIN all of whose finite unions get the same color. Gowers formulated and proved a generalization of Hindmans Theorem to obtain the oscillation stability of c_0, the space of real sequences converging to 0 endowed with the supremum norm. We present a combinatorial proof of the finite version of Gowers generalization of Hindmans Theorem. For a fixed natural number k, the objects that are being colored are finitely supported functions defined on the natural numbers, that take values $-k, -(k-1), \ldots, -1, 0, 1, \ldots, k$. We first obtain the result for functions that take only non-negative values and then describe how to reduce the general result to this special case. Our approach to obtain the general result from the special case for non-negative functions also works for the infinite version of Gowers' Theorem.

Revantha Ramanayake, *Between axioms and structural rules in the display calculus.* Vienna University of Technology. revantha@logic.at

A display calculus is a type of proof-calculus which can be viewed as the proof-theoretic face of the algebraic semantics of a logic. Here we will consider how to obtain analytic display calculi for axiomatic extensions of a logic (using substructural logics as an example), and then discuss how the issue of conservativity between the logic of the display calculus and certain sublogics can be investigated directly in this setting. This is joint work with Agata Ciabattoni and Nikolaos Galatos.

Lynn Scow, *Transfer of the Ramsey Property between Classes.* Vassar College. lyscow@vassar.edu

In this talk we will investigate some ways in which the property of being Ramsey may be transferred between classes of finite structures. We look at some category-theoretic and model-theoretic approaches.

Nam Trang, *On canonical models of determinacy and ω_1 is $\mathbb{R}$-supercompact.* Carnegie-Mellon University. namtrang35@gmail.com

We discuss some basic results regarding structure theory of canonical models of AD + ω_1 is $\mathbb{R}$-supercompact. These are models of the form $L(\mathbb{R}, \mu)$ where μ is a normal fine measure on $P_{\omega_1}(\mathbb{R})$ that witnesses ω_1 is $\mathbb{R}$-supercompact in the model. As an application, we answered positively a question asked by H.W. Woodin in the early 1980's on whether there is at most one such model under AD. The main result is joint work with D. Rodriguez.

Toshimuchi Usuba, *Long Cut and Choose games of the infinite distributive law.* Kobe University. usuba@people.kobe-u.ac.jp

For cardinals κ and μ, the Cut and Choose game $\mathcal{G}^{\kappa}_{<\mu}$ on atomless complete Boolean algebras was introduced by Jech [1], and it is connected with the $(\kappa, \infty, <\mu)$-distributive law. Jech showed that for an infinite cardinal κ, the player ONE does not have the winning strategy of the Cut and Choose game $\mathcal{G}^{\kappa}_{<2}$ on atomless complete Boolean algebra $\mathcal{B}$ if, and only if, $\mathcal{B}$ is (κ, ∞)-distributive. In the case $\mu = \omega$, if the player ONE does not have the winning strategy of the Cut and Choose game $\mathcal{G}^{\omega}_{<\omega}$ on $\mathcal{B}$, then $\mathcal{B}$ is $(\omega, \infty, <\omega)$-distributive, but Kambrelis [2] showed the converse does not hold. In this talk we consider some connections between and $\mathcal{G}^{\kappa}_{<\omega}$ and the $(\kappa, \infty, <\omega)$-distributive law in the case $\kappa > \omega$. We show that if $\kappa > \omega$ is a cardinal, then the player ONE does not have the winning strategy of the Cut and Choose game $\mathcal{G}^{\kappa}_{<\omega}$ on $\mathcal{B}$ if, and only if, $\mathcal{B}$ is (κ, ∞)-distributive. We also consider the game $\mathcal{G}^{\kappa}_{<\mu}$ and the $(\kappa, \infty, <\mu)$-distributive law when $\kappa, \mu > \omega$.

[1] T. J. Jech, *More game-theoretic properties of Boolean algebras*, **Ann. Pure Appl. Logic**, Vol. 26 (1984) 11-29.

[2] A. Kambrelis, *On the weak distributivity game*, **Ann. Pure Appl. Logic**, Vol. 66 (1994) 19-26.

Lawrence Valby, *↓-posets.* University of California at Berkeley. lawrence.valby@gmail.com

Let S be a semilattice with identity. Let S act on a set C. For $c, d \in C$ put $c \leq d$ iff there is some $s \in S$ with $ds = c$. Then $(C, \leq)$ is a poset. Let's call the posets that arise in this way ↓-posets. We give a reasonable second order characterization of ↓-posets and show that there is no first order characterization.

Joseph Van Name, *Boolean-valued point-free topology.* University of South Florida. jvanname@mail.usf.edu

We shall use the ideas and results of Boolean-valued analysis to study the correspondence between frames in the set-theoretic universe V and objects $\dot{X}$ in the Scott-Solovay Boolean valued universe V^B such that $V^B \models$ "$\dot{X}$ is a frame".

Xin Ma, *Schauder Equivalence Relations.* Texas A&M University. dongodel@mail.math.tamu.edu

Schauder equivalence relations are a kind of equivalence relations generated by a basic sequences in Banach spaces. This study can trace back to the work of Dougherty and Hjorth. In this talk, I will discuss Borel reducibility and non-reducibility between this kind of Equivalence relations. In particular, I will mainly present some new results concerning complexity of equivalence relations generated by "Tsirelson-like" space, Orlicz and Lorentz sequence spaces. In addition, the boundaries and bases of Schauder equivalence relations will also be discussed.

Joseph Zielinski, *The complexity of the homeomorphism relation between compact metric spaces.* University of Illinois at Chicago. jzieli2@uic.edu

For equivalence relations E and F on Polish spaces X and Y, respectively, E is Borel reducible to F when there is a Borel-measurable function from X to Y satisfying xEy iff $f(x)Ff(y)$. H. Becker and A. S. Kechris demonstrated that there are equivalence relations arising from Polish group actions that reduce all other such orbit equivalence relations. Moreover, J. D. Clemens, S. Gao, Kechris, J. Melleray, and M. Sabok, have variously shown that the natural relations of isometry between separable complete metric spaces, linear isometry between separable Banach spaces, and isomorphism of separable C^*-algebras share the same Borel-reducibility degree with these maximal orbit equivalence relations. We outline a proof that the relation of homeomorphism between metrizable compact spaces is also Borel bireducible with the complete orbit equivalence relations of Polish group actions.

Andrew Zucker, *The Samuel compactification of an automorphism group: some open questions.* Carnegie-Mellon University.
zucker.andy@gmail.com

In this talk, we will start with a Fraïssé class $\mathcal{K}$ with Fraïssé limit $\mathbf{K}$. Letting $G = \mathrm{Aut}(\mathbf{K})$, we will then construct the Samuel compactification of G; using this object, we will show how combinatorial properties of the class $\mathcal{K}$ have consequences for the dynamical properties of G. If time permits, we will discuss a number of open questions; in particular, do oligomorphic permutation groups have metrizable universal minimal flows?