ESI Workshop on Large Cardinals and Descriptive Set Theory

Vienna, June 14 - 27 2009

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CONTENTS

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Welcome to the ESI Set Theory Workshop!

The Programme Committee is gratified by the unexpectedly large participation of so many excellent set-theorists from so many parts of the world in our meeting. Our aim in the Workshop is to hear about the latest developments in large cardinals, forcing and descriptive set theory from both leading researchers as well as some of the most promising young people working in these areas. We hope and expect that you will find our meeting both enjoyable and informative.

The Programme Committee
SY FRIEDMAN, Chair
MARTIN GOLDSTERN
RONALD JENSEN
ALEKOS KECHRIS
HUGH WOODIN

Time	Monday 15	Tuesday 16	Wednesday 17	Thursday 18	Friday 19
	9:00 welcome				
08:50–09:40 / 09:15–09:40	Viale	Larson	Hamkins	Foreman	Farah
	COFFEE	COFFEE	COFFEE	COFFEE	COFFEE
10:05–10:55 / 10:00–10:50	Soukup	Brendle	Jackson	Ishiu	Monk
11:10–11:35 / 11:00–11:50	Schlutzenberg	Ikegami	Löwe	Yorioka	Koenig
11:45–12:10	Honzik	Sinapova		Rinot	Gitman
			Mostalm 12:15		
14:10–15:00	Krueger	Apter		Mildenberger	Schindler
15:15–16:05	Fuchino	Aspero		Pawlikowski	Stanley
	COFFEE	COFFEE		COFFEE	COFFEE
16:30–16:55	Johnstone	Mota		Sabok	Schlicht
17:05–17:30	Thompson	Torres		Dobrinen	Dimonte

	Monday 22	Tuesday 23	Wednesday 24	Thursday 25	Friday 26
09:00–09:50	Andretta	Bagaria	Sauer	Ferenczi	Foreman
COFFEE					
10:15–11:05	Dodos	Dodos	Dodos	Gao	Miller
11:20–12:10	Lopez–Abad	Melleray	Nguyen Van The	Nguyen Van The	Nguyen Van The
14:10–15:00	Zeleny	Motto Ros		Coskey	Thomas
15:15–16:05	Camerlo	Kanovei		Laflamme	Rosendal
COFFEE					
16:30–17:20	Hrusak	Mátrai	Lusthaus 16:30	Törnquist	Hjorth

Monday, June 15

9:00: **Welcome!**

09:15-09:40: **Matteo Viale**, *Some questions on the models of MM*

COFFEE BREAK

10:05-10:55: **Lajos Soukup**, *On properties of families of sets*

11:10-11:35: **Farmer Schlutzenberg**, *Homogeneously Suslin sets in mice with Woodin cardinals*

11:45-12:10: **Radek Honzik**, *Large cardinals and the continuum function*

LUNCH BREAK

14:10-15:00: **John Krueger**, *The Weak Reflection Principle Versus the Reflection Principle*

15:15-16:05: **Sakaé Fuchino**, *Fodor-type reflection principle and its "mathematical" characterizations*

COFFEE BREAK

16:30-16:55: **Thomas Johnstone**, *Substituting Supercompactness by Strong Unfoldability*

17:05-17:30: **Katherine Thompson**, *Nonexistence of universal models at the successors of singular strong limit cardinals*

Tuesday, June 16

08:50-09:40: **Paul Larson**, *Universally measurable sets in generic extensions*

COFFEE BREAK

10:05-10:55: **Jörg Brendle**, *Cardinal invariants of analytic quotients*

11:10-11:35: **Daisuke Ikegami**, *Real Blackwell Determinacy*

11:45-12:10: **Dima Sinapova**, *Exploring Singular Cardinal Combinatorics*

LUNCH BREAK

14:10-15:00: **Arthur Apter**, *Indestructible strong compactness but not supercompactness*

15:15-16:05: **David Aspero**, *A reflection principle compatible with the continuum large (1)*

COFFEE BREAK

16:30-16:55: **Miguel Angel Mota**, *A reflection principle with the continuum large (2)*

17:05-17:30: **Victor Torres**, *Rado's Conjecture, Saturation of the nonstationary ideal on ω_1, and two cardinal diamonds*

Wednesday, June 17

08:50-09:40: **Joel David Hamkins**, *General relations of the set-theoretic universe to its forcing extensions and grounds*

    COFFEE BREAK

10:00-10:50: **Stephen Jackson**, *New partition results from AD*

11:00-11:50: **Benedikt Löwe**, *Eventually Different Forcing at the Second Level of the Projective Hierarchy*

Thursday, June 18

08:50-09:40: **Matt Foreman**, *Inner models for huge cardinals and Strong Chang's Conjecture*

    COFFEE BREAK

10:05-10:55: **Tetsuya Ishiu**, *A precipitous club guessing ideal on ω_1*

11:10-11:35: **Teruyuki Yorioka**, *CCC without random reals*

11:45-12:10: **Assaf Rinot**, *Diamond on successors of singulars*

    LUNCH BREAK

14:10-15:00: **Heike Mildenberger**, *Proper translation*

15:15-16:05: **Janusz Pawlikowski**, *Playing with countable support iteration*

    COFFEE BREAK

16:30-16:55: **Marcin Sabok**, *On forcing with σ-ideals of closed sets*

17:05-17:30: **Natasha Dobrinen**, *Tukey degrees of ultrafilters*

Friday, June 19

08:50-09:40: **Ilijas Farah**, *Nonseparable UHF algebras*

    COFFEE BREAK

10:05-10:55: **J. Donald Monk**, *Towers in Boolean algebras*

11:10-11:35: **Bernhard Koenig**, *Different ways to produce non-special ω_2-Aronszajntrees*

11:45-12:10: **Victoria Gitman**, *Ramsey-like cardinals*

    LUNCH BREAK

14:10-15:00: **Ralf Schindler**, *Bounded forcing axioms and reflection*

15:15-16:05: **Mack Stanley**, *The Largest Large Cardinal and the Inner Model Hypothesis*

    COFFEE BREAK

16:30-16:55: **Philipp Schlicht**, *Thin equivalence relations in scaled pointclasses*

17:05-17:30: **Vincenzo Dimonte**, *Non-proper elementary embeddings beyond $L(V_{\lambda+1})$*

Monday, June 22

09:00-09:50: **Alessandro Andretta**, *Some descriptive set theory related to the Lebesgue density theorem*

  COFFEE BREAK

10:15-11:05: **Pandelis Dodos**, *Applications of Descriptive Set Theory in the Geometry of Banach spaces*

11:20-12:10: **Jordi Lopez-Abad**, *Generic constructions of Banach spaces*

  LUNCH BREAK

14:10-15:00: **Miroslav Zelený**, *Games and σ-porosity*

15:15-16:05: **Riccardo Camerlo**, *Standard universal dendrites as small Polish structures*

  COFFEE BREAK

16:30-17:20: **Michael Hrušák**, *Katetov order on Borel ideals*

Tuesday, June 23

09:00-09:50: **Joan Bagaria**, $C^{(n)}$-*cardinals*

  COFFEE BREAK

10:15-11:05: **Pandelis Dodos**, *Applications of Descriptive Set Theory in the Geometry of Banach spaces*

11:20-12:10: **Julien Melleray**, *Metric structures and applications to the theory of topological groups*

  LUNCH BREAK

14:10-15:00: **Luca Motto Ros**, *A universality property for analytic equivalence relations and quasi-orders*

15:15-16:05: **Vladimir Kanovei**, *On definability of some counterexamples in descriptive set theory*

  COFFEE BREAK

16:30-17:20: **Tamás Mátrai**, *Cofinal types of definable directed orders*

Wednesday, June 24

09:00-09:50: **Norbert Sauer**, *On partitions of relational structures*

      COFFEE BREAK

10:15-11:05: **Pandelis Dodos**, *Applications of Descriptive Set Theory in the Geometry of Banach spaces*

11:20-12:10: **Lionel Nguyen Van The**, *Structural Ramsey theory and topological dynamics*

Thursday, June 25

09:00-09:50: **Valentin Ferenczi**, *Complexity of isomorphism between Banach spaces and inevitable list of Gowers*

      COFFEE BREAK

10:15-11:05: **Su Gao**, *The Descriptive Complexity of Free Bernoulli Subflows*

11:20-12:10: **Lionel Nguyen Van The**, *Structural Ramsey theory and topological dynamics*

      LUNCH BREAK

14:10-15:00: **Samuel Coskey**, *On dimension and Borel reducibility*

15:15-16:05: **Claude Laflamme**, *Partitions and Indivisibility Properties of Countable Dimensional Vector Spaces*

      COFFEE BREAK

16:30-17:20: **Asger Törnquist**, *The lifting problem for the group of measure preserving transformations of the unit interval*

Friday, June 26

09:00-09:50: **Matt Foreman**, *Models for Measure Preserving Transformations*

      COFFEE BREAK

10:15-11:05: **Ben Miller**, *Forceless, ineffective, powerless proofs of descriptive set-theoretic dichotomy theorems.*

11:20-12:10: **Lionel Nguyen Van The**, *Structural Ramsey theory and topological dynamics*

      LUNCH BREAK

14:10-15:00: **Simon Thomas**, *Some Consequences of Martin's Conjecture*

15:15-16:05: **Christian Rosendal**, *Infinite asymptotic games and an exact Ramsey principle for block sequences*

      COFFEE BREAK

16:30-17:20: **Greg Hjorth**, *Yet another proof of Gaboriau-Popa*

Some descriptive set theory related to the Lebesgue density theorem

The Lebesgue density theorem says that if $A \subseteq {}^{\omega}2$ is measurable, then A is almost equal to

$$\mathcal{D}(A) = \{x \in {}^{\omega}2 \mid x \text{ has density 1 in } A\},$$

and therefore $\mathcal{D}$ selects a set from each measure class. It turns out that $\mathcal{D}(A)$ is $\mathbf{\Pi}^0_3$ — in fact it can be complete $\mathbf{\Pi}^0_3$. I will present some partial results on the complexity of $\mathcal{D}(A)$ for various As.

   This is joint work with Riccardo Camerlo.

Alessandro Andretta
Week 2, Monday June 22, 09:00–09:50   *University of Torino (Italy)*

Indestructible strong compactness but not supercompactness

I will discuss the construction of a model containing a supercompact cardinal κ whose strong compactness, but not supercompactness, is fully indestructible under κ-directed closed forcing. This is joint work with Joel Hamkins and Grigor Sargsyan.

Arthur Apter
Baruch College and The Graduate Center,
Week 1, Tuesday June 16, 14:10–15:00   *CUNY (USA)*

A reflection principle compatible with the continuum large (1)

I will define a certain reflection principle that follows from BPFA. Then I will show how to build a proper poset forcing this principle together with the continuum larger than $omega_2$. This poset can be described as a "rigid" iteration with systems of side conditions. This is joint work with Miguel Angel Mota.

David Aspero
Week 1, Tuesday June 16, 15:15–16:05   *University of Barcelona (Spain)*

$C^{(n)}$-cardinals

Let $C^{(n)}$ be the proper class of cardinals κ that are Σ_n-correct in V, meaning that V_κ is a Σ_n-elementary substructure of V. We will consider several types of large cardinal notions obtained by requiring that both the critical point κ of an elementary embedding $j : V \to M$ and its image under j are in $C^{(n)}$. These are the $C^{(n)}$-cardinals. One of the results is that Vopěnka's Principle is equivalent to the existence of a $C^{(n)}$-extendible cardinal, for every n.

Joan Bagaria
Week 2, Tuesday June 23, 09:00–09:50   *University of Barcelona (Spain)*

Cardinal invariants of analytic quotients

Let $\mathcal{I}$ be a definable (e.g., an analytic) ideal on the natural numbers ω, and consider the quotient $\mathcal{P}(\omega)/\mathcal{I}$, equipped with the ordering induced by the inclusion relation on ω. If $\mathcal{I} = \mathrm{Fin}$ is the ideal of finite sets, this structure has been intensively investigated, and a number of cardinal invariants which describe its combinatorial properties have been defined.

In this talk I will present a few results on analogous cardinal invariants for the case where $\mathcal{I}$ is an ideal distinct from Fin. If $\mathcal{I}$ is not F_σ, the quotient is not σ-closed in general, and some cardinal invariants may become countable. Therefore I will concentrate on the case where $\mathcal{I}$ is an F_σ-ideal. It turns out that $\mathcal{P}(\omega)/\mathcal{I}$ looks rather similar to $\mathcal{P}(\omega)/\mathrm{Fin}$ in this case, that many inequalities between cardinal invariants which hold in the classical case can be generalized, and similarly for consistency results. In fact, cardinal invariants of $\mathcal{P}(\omega)/\mathcal{I}$ are rather hard to distinguish from their classical counterparts. However, we know a few consistency results. For example, the splitting number of $\mathcal{P}(\omega)/\mathcal{I}$ where $\mathcal{I}$ is any summable ideal may be strictly smaller than the splitting number of $\mathcal{P}(\omega)/\mathrm{Fin}$.

Jörg Brendle

Week 1, Tuesday June 16, 10:05–10:55 *Kobe University (Japan)*

Standard universal dendrites as small Polish structures

Small Polish structures have been introduced recently by Krupiński to apply some model theoretic notions in a descriptive set theoretic context. Examples of small Polish structures will be presented, with a discussion of some open problems. The case of dendrites will be particularly examined.

Riccardo Camerlo

Week 2, Monday June 22, 15:15–16:05 *Polytechnic of Turin (Italy)*

On dimension and Borel reducibility

Borel reducibility of equivalence relations was introduced by Friedman and Stanley in 1989. This powerful concept allows us to use methods of descriptive set theory to compare the complexity of classification problems from other areas of mathematics.

Our starting point will be the amazing result, due to Hjorth and Thomas in 1998-2001, that the complexity of the classification problem for torsion-free abelian groups of finite rank increases strictly with the rank. Other invariants besides just the rank can be used. For instance, Thomas showed that even once the rank is fixed, the classification subproblems for p-local and q-local groups have incomparable complexities.

In each of these results, the "dimension" of the classification problem plays a crucial role. This leaves open the following natural question, which we will discuss in this talk: To what extent do the dimensions of two classification problems decide their relationship under Borel reducibility?

Samuel Coskey

Week 2, Thursday June 25, 14:10–15:00 *City University of New York (USA)*

Non-proper elementary embeddings beyond $L(V_{\lambda+1})$

So far the strongest great cardinals hypothesis that has received a deep and shared analysis is the existence of an elementary embedding j from $L(V_{\lambda+1})$ to itself, for some $\lambda > cp(j)$. There were various attempts to define hypotheses stronger than I0, but Woodin's approach caught my attention: since he found several similarities between $L(V_{\lambda+1})$ under I0 and $L(\mathbb{R})$ under AD, he continued to carry on the comparison trying to find a hypotesis similar to $AD_{\mathbb{R}}$, constructing a sequence of $E_\alpha^0(V_{\lambda+1})$ such that $V_{\lambda+1} \subseteq E_\alpha^0(V_{\lambda+1}) \subseteq V_{\lambda+2}$, that imitates the construction of the minimum model of $AD_{\mathbb{R}}$.

My attention is focused on the properties of the elementary embeddings from $L(E_\alpha^0(V_{\lambda+1}))$ to itself, and the first property that I analyzed is *properness*, i.e. the cofinality in $\Theta^{L(E_\alpha^0(V_{\lambda+1}))}$ of the fixed points of the embedding, that it turns out is quite important in preserving the similarity with determinacy. The first original result is the existence of an α and a $j : L(E_\alpha^0(V_{\lambda+1})) \prec L(E_\alpha^0(V_{\lambda+1}))$ that is not proper. This both validates the definition of proper elementary embedding, since it states for the first time that the definition is not trivial, and fills a gap in a Theorem by Woodin that is fundamental for this new research.

Vincenzo Dimonte
Week 1, Friday June 19, 17:05–17:30   *University of Turin (Italy)*

Tukey degrees of ultrafilters

This is joint work with Stevo Todorcevic. Let U and V be ultrafilters on countable base sets. We say that V is Tukey reducible to U ($V \leq_T U$) if there is a "Tukey map" $g : V \to U$, meaning that g maps unbounded subsets of V to unbounded subsets of U. Equivalently, there is a "cofinal" map $f : U \to V$ which maps cofinal subsets of U to cofinal subsets of V. Tukey reducibility on ultrafilters isa generalization of Rudin-Keisler reducibility. We present a canonization of cofinal maps from a p-point into another ultrafilter as monotone continuous functions, and some analogues for ultrafilters with similarities to p-points. We also give some results on the structure of the Tukey types of ultrafilters on ω and FIN, concentrating on p-points, selective ultrafilters, and ultrafilters with similar properties.

Natasha Dobrinen
Week 1, Thursday June 18, 17:05–17:30   *University of Denver (USA)*

Applications of Descriptive Set Theory
in the Geometry of Banach spaces

We will review some recent advances on the interaction between Descriptive Set Theory and the Geometry of Banach spaces. We will concentrate around problems which can be traced back to the beginnings of Banach Space Theory and asking whether certain classes of separable Banach spaces admit universal spaces with special properties. Recently, all these problems are solved and the crucial conceptual vehicle for arriving to the solution is the notion of a strongly bounded class of separable Banach spaces. Beside its intrinsic functional-analytic interest, this notion points out towards a more general phenomenon which seems to be of interest also to set theorists.

Pandelis Dodos
National Technical University of Athens
(Greece)

Week 2, Tutorial:
Monday June 22, 10:15–11:05
Tuesday June 23, 10:15–11:05
Wednesday June 24, 10:15–11:05

Nonseparable UHF algebras

Uniformly HyperFinite (UHF) algebras are those C^* algebras in which every finite subset is 'near' a finite-dimensional full matrix subalgebra. This can be formalized in three different ways, all three being equivalent in the separable case.

  Separable UHF algebras were classified in the 1960s by Glimm and Dixmier. Dixmier asked whether three definitions are equivalent in the nonseparable case. I will give a complete answer to this question. Then I will state some even more basic questions that we could not answer. This is a joint work with Takeshi Katsura.

Ilijas Farah
York University, Toronto (Canada)

Week 1, Friday June 19, 08:50–09:40

Complexity of isomorphism between Banach spaces
and inevitable list of Gowers

We shall discuss two directions of classification of separable Banach spaces up to isomorphism, and their interaction. The first direction is a classification "up to subspaces", as initiated by the work of Gowers: in this direction one looks for a list of "elementary" spaces, such that any Banach space contains a subspace isomorphic to one in the list. The second direction is a classification "by complexity", where each space is characterized by the complexity of the relation of isomorphism between its subspaces.

Valentin Ferenczi
University of Sao Paulo (Brazil)

Week 2, Thursday June 25, 09:00–09:50

Inner models for huge cardinals and Strong Chang's Conjecture

Chang's Conjectures are strengthenings of the Lowenheim-Skolem theorem. Given an arbitrary structure A they ask for an elementary substructure B where the cardinalities of the intersections of B with various predicates are specified in advance.

If A is well-founded one could also ask that the transitive collapse of B be large; i.e. that B have strong condensation properties. In this talk a strong Chang's Conjecture of this form is presented. The consistency strength of this Chang's Conjecture holding at ω_3 is between a 2-huge and a huge cardinal.

<div align="right">

Matt Foreman
</div>

Week 1, Thursday June 18, 08:50–09:40   *University of California, Irvine (USA)*

Models for Measure Preserving Transformations

Measure preserving transformations arise in many different settings. Each setting gives its own topology on the collection of transformations and some provide algebraic structure as well.

A natural question is whether two different settings have the same generic dynamical properties and give the same Borel structure on the measure preserving transformations.

Dan Rudolph gave a meta-conjecture that all settings are equivalent. In these two talks we make this precise in various ways and prove it. We also introduce some new settings such as the space of rational invariant measures.

<div align="right">

Matt Foreman
</div>

Week 2, Friday June 26, 09:00–09:50   *University of California, Irvine (USA)*

Fodor-type reflection principle and its "mathematical" characterizations

Fodor-type Reflection Principle (FRP) is the assertion that the following $\mathrm{FRP}(\kappa)$ holds for all regular cardinals $\kappa > \aleph_1$:

$\mathrm{FRP}(\kappa)$: For any stationary $E \subseteq E^\kappa_\omega$ and $g : E \to [\kappa]^{\aleph_0}$, there is an $I \in [\kappa]^{\aleph_1}$ such that

(1) $cf(I) = \omega_1$;   (2) I is closed with respect to g; and

(3) for any $f : E \cap I \to \kappa$ if $f(\alpha) \in g(\alpha) \cap \alpha$ for all $\alpha \in E \cap I$, then there is a $\beta^* \in I$ such that $f^{-1}\text{``}\{\beta^*\}$ is stationary in $\sup(I)$.

Using a new characterization of FRP we show that many reflection theorems originally obtained as consequences of Axiom R are actually equivalent to FRP over ZFC. The following two are among such assertions equivalent to FRP:

– For every locally countably compact topological space X, if all subspaces of X of cardinality $\leq \aleph_1$ are metrizable, then X itself is metrizable.

– For any graph G, if all subgraphs of G of cardinality $\leq \aleph_1$ have countable coloring number, then G itself has countable coloring number.

The main results of this talk are obtained in a joint research with Lajos Soukup, Hiroshi Sakai and Toshimichi Usuba.

<div align="right">

Sakaé Fuchino
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Week 1, Monday June 15, 15:15–16:05   *Chubu University (Japan)*

The Descriptive Complexity of Free Bernoulli Subflows

I will talk about some joint work with Jackson and Seward on some applications of descriptive set theory to problems in dynamical systems. We have previously shown that free Bernoulli subflows exist for all countably infinite groups. In this talk I will focus on two problems: one is to characterize the descriptive complexity of all (minimal) free Bernoulli subflows, and another is to determine the exact complexity of the isomorphism relation of (minimal) free Beroulli subflows. For the first problem the complete answer is given, which also introduces a new concept that seems to have never been studied in combinatorial group theory. For the second problem the complete answer is not known, but I will talk about partial results obtained.
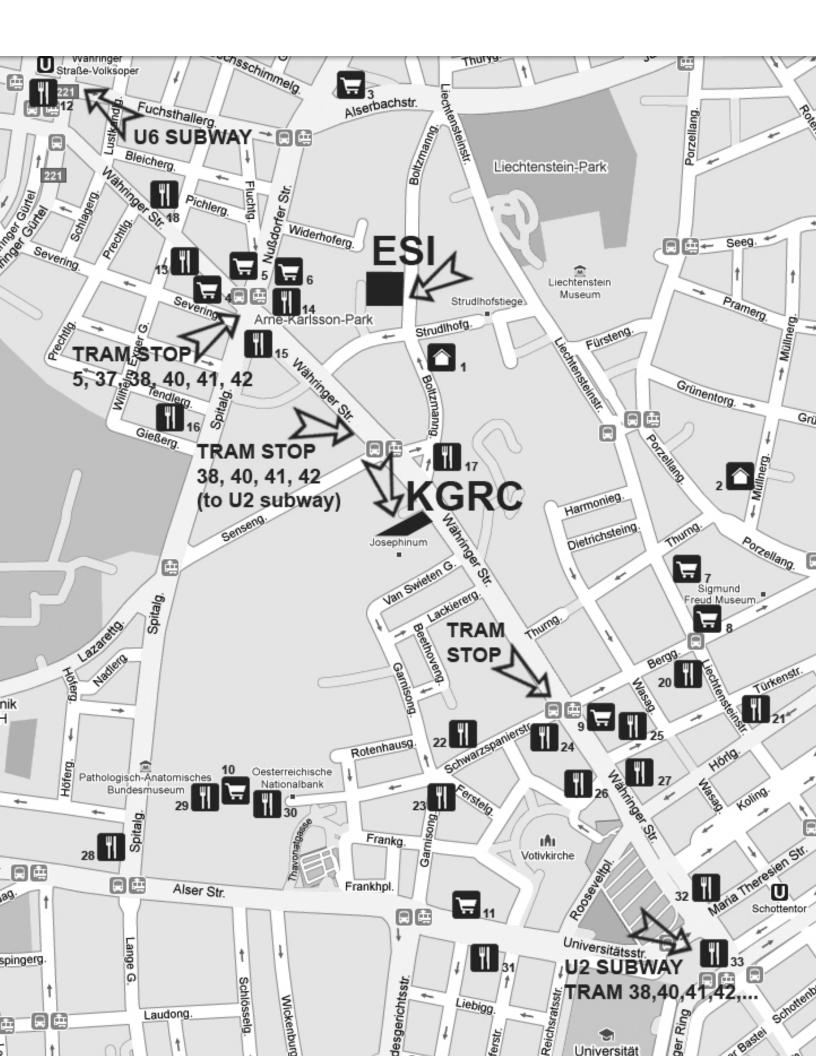
Su Gao

Week 2, Thursday June 25, 10:15–11:05   *University of North Texas (USA)*

Ramsey-like cardinals

One of the less known characterizations of a Ramsey cardinal κ involves the existence of certain types of elementary embeddings for transitive sets of size κ satisfying a large fragment of ZFC. I introduce new large cardinal axioms by isolating and generalizing the key properties of Ramsey embeddings and show that they form a natural hierarchy between weakly compact cardinals and measurable cardinals. The stronger of these large cardinal notions are better suited than Ramsey cardinals for indestructiblity arguments. The weaker of the new large cardinals further our knowledge about the elementary embedding properties of smaller large cardinals, in particular those still consistent with $V = L$. A large portion of this work is joint with Philip Welch.

Victoria Gitman

Week 1, Friday June 19, 11:45–12:10   *New York City College of Technology (USA)*

U6 SUBWAY

ESI

KGRC

TRAM STOP
5, 37, 38, 40, 41, 42

TRAM STOP
38, 40, 41, 42
(to U2 subway)

TRAM
STOP

U2 SUBWAY
TRAM 38, 40, 41, 42,...

Liechtenstein-Park

Liechtenstein Museum

Sigmund Freud Museum

Josephinum

Arne-Karlsson-Park

Strudlhofstiege

Pathologisch-Anatomisches Bundesmuseum

Oesterreichische Nationalbank

Votivkirche

Universität

Fuchsthallerg.
Bleicherg.
Währinger Str.
Pichlerg.
Severing.
Severing.
Prechtlg.
Prechtlg.
Schlagerg.
Währinger Gürtel
Lustkandlg.
Fluchtg.
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Widerhoferg.
Währinger Str.
Tendlerg.
Gießerg.
Spitalg.
Wilhelm Exner G.
Senseng.
Spitalg.
Lazarettg.
Nadlerg.
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Höferg.
Lange G.
Laudong.
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Frankg.
Frankhpl.
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Boltzmanng.
Boltzmanng.
Strudlhofg.
Liechtensteinstr.
Liechtensteinstr.
Fürsteng.
Grünentorg.
Harmonieg.
Dietrichsteing.
Porzellang.
Porzellang.
Müllnerg.
Müllnerg.
Pramerg.
Seeg.
Porzellang.
Türkenstr.
Alserbachstr.
Liechtensteinstr.
Fuchsschimmelg.
Thurygasse
Währinger Straße-Volksoper
Schottentor

For more detailed information please visit the website of the conference and go to the "Info" part: `http://www.logic.univie.ac.at/conferences/2009_esi/`

Hotels.

    1 Arcotel Boltzmann
    2 Pension Ani-Falstaff

Supermarkets, Bakeries.

    3 Spar (supermarket with Deli counter and ATM machine)
    4 Anker (bakery)
    5 Ströck (bakery)
    6 Hofer (supermarket, slightly cheaper than Spar or Billa), ATM machine close by
    7 Spar (supermarket with Deli counter)
    8 Ströck (bakery, open on Sunday)
    9 Mann (bakery)
    10 Billa (supermarket with Deli counter)
    11 Billa (supermarket)

Restaurants, Cafes, Student Cafeterias, Würstelstände/Kebap/Falafel.

    12 Falafel / Kebab (kiosk, open during the night)
    13 Vegirant (vegetarian wholefood dishes only)
    14 Kebaphaus Meksan
    15 Lenek's Wiener Würstelstand (kiosk selling sausages, open during the night)
    16 Giuliano 2 (pizza and pasta, take-away available)
    17 Flein (Austrian and international fare, beautiful garden)
    18 Café Weimar (classic Viennese *Kaffeehaus*, a bit expensive)

    19 Café Monokel, Viennese *Kaffeehaus* and restaurant (set lunch)
    20 Hitomi (Japanese restaurant, very low prices)
    21 Der Wiener Deewan (Pakistani food with vegetarian options, pay whatever you want.)
    22 Weltcafe (organic food and coffee)
    23 Reformhaus Regenbogen (vegetarian and health food, seating for 8 people, take-away available)
    24 Regenbogenstube (organic food, vegetarian and vegan selection, set lunch offers)
    25 AAI Mensa (Student cafeteria, two menus, one vegetarian)
    26 Bar Restaurant Cafe Roth (upscale Austrian and Viennese food)
    27 Argos Imbiss (kiosk selling kebap, falafel)
    28 Restaurant IEGA Lee & Kim (Korean and Japanese food)
    29 Stiegl Ambulanz (bar food, microbrewery in house, nice outdoor areas on the AKH Campus)
    30 Universitätsbräuhaus (traditional Austrian pub food, barbeque, nice outdoor areas on the AKH Campus)
    31 NIG Mensa (Student cafeteria, not as good as the AAI mensa)
    32 bagel station (American-style bagel and coffee joint)
    33 U2 subway station Schottentor: many places to get food, e.g., a Mann store (bakery, open on Sunday)

Trams on Währinger Straße that go *towards* Schottentor (towards south-east) stop at Spitalgasse/Nußdorferstraße, Senseng/Boltzmanng, Schwarzspanierstr/Bergg and Schottentor; trams *from* Schottentor stop at Schwarzspanierstr/Bergg and Spitalg/Nußdorferstr only.

General relations of the set-theoretic universe
to its forcing extensions and grounds

I shall describe recent work focussed on general relations of the set-theoretic universe to its forcing extensions and grounds. A set theoretical assertion is forceable (or possible) if it holds in some forcing extension, and necessary if it holds in all forcing extensions.

These concepts are fundamentally modal in nature, and it is natural to inquire which modal assertions are valid for this forcing interpretation. What is the modal logic of forcing? The answer, established in joint work with B. Loewe, is that if ZFC is consistent, then the ZFC-provably valid principles of forcing are exactly those in the modal theory known as S4.2.

The ideas admit a duality, looking downward to ground models rather than upward to forcing extensions, and in this case we have established the same S4.2 theory of validities, provided that ground models are downward directed. The Downward Directedness hypothesis is the principal open question of set-theoretic geology, introduced by myself, Fuchs and Reitz, and one of our initial results is that every model of ZFC is the Mantle—the intersection of all grounds—of another model of ZFC. Some of this analysis engages pleasantly with various philosophical views on the nature of mathematical existence.

Joel David Hamkins
Week 1, Wednesday June 17, 08:50–09:40   *City University of New York (USA)*

Yet another proof of Gaboriau-Popa

Damien Gaboriau and Sorin Popa showed that the free group has uncountably many free, measure preserving, ergodic actions up to orbit equivalence. I will give a proof which, unlike the earlier proofs of this result, does not use property (T).

Greg Hjorth
Week 2, Friday June 26, 16:30–17:20   *University of Melbourne (Australia)*

Large cardinals and the continuum function

By Easton's results, it is known that ZFC can prove very little about the continuum function. However, this result does not carry over directly to extensions of ZFC by large cardinals. This is due to the reflection properties of large cardinals, such as a measurable cardinal. We study the following problem using a cardinal-preserving forcing: given a universe of sets with large cardinals, which continuum functions are compatible with given large cardinals? This is a generalization of Easton's theorem to situations with large cardinals. As a bonus, we can extend these results naturally to include singular cardinals which will fail SCH, studying the compatibility of continuum functions and cardinals failing SCH.

Radek Honzik
Week 1, Monday June 15, 11:45–12:10   *Charles University, Prague (Czech Republic)*

Katetov order on Borel ideals

We will present two dichotomies for Borel ideals involving the Katetov order.

Michael Hrušák

Week 2, Monday June 22, 16:30–17:20   *University of Mexico (Mexico)*

Real Blackwell Determinacy

Blackwell games are infinite games with (slightly) imperfect information while Gale-Stewart games are infinite games with perfect information. Martin proved that the Axiom of Determinacy (AD) implies the Axiom of Blackwell Determinacy (Bl-AD) and conjectured the converse. We show that the Axiom of Real Blackwell Determinacy (Bl-AD$_\mathbb{R}$) implies the consistency of AD and hence the consistency of Bl-AD$_\mathbb{R}$ is strictly greater than that of AD. This is a joint work with David de Kloet and Benedikt Löwe.

Daisuke Ikegami

Week 1, Tuesday June 16, 11:10–11:35   *University of Amsterdam (Netherlands)*

A precipitous club guessing ideal on ω_1

For each club guessing sequence, we can define a natural ideal associated with it, called a club guessing ideal. I will talk about how to prove the consistency relative to a measurable cardinal that there is a precipitous club guessing ideal on ω_1 but the non-stationary ideal on ω_1 is not precipitous. If time permits, I will discuss other results about the precipitousness of natural ideals.

Tetsuya Ishiu

Week 1, Thursday June 18, 10:05–10:55   *Miami University (USA)*

New partition results from AD

We obtain two new partition properties from AD. The first result (joint with A. Apter and B. Löwe) is that for every inaccessible Suslin cardinal κ we have the polarized partition property

$$(\kappa, \kappa^+, \kappa^{++}) \rightarrow (\kappa, \kappa^+, \kappa^{++})^{\kappa,\kappa,\kappa}.$$

This was used to obtain the consistency relative to ZF of the possible patters of cofinalities of the first three uncountable cardinals.

The second result pins down the exact partition properties of the regular cardinals below the projective ordinals.

Stephen Jackson

Week 1, Wednesday June 17, 10:00–10:50   *University of North Texas (USA)*

Substituting Supercompactness by Strong Unfoldability

Strongly unfoldable cardinals are relatively low in the hierarchy of large cardinals, they lie well below measurable cardinals and are consistent with $V = L$. In this talk I will discuss recent results that have shown how strong unfoldability can serve as a highly efficient substitute for supercompactness in several large cardinal phenomena. In particular, I will discuss a Laver-like indestructibility theorem for strong unfoldability and a Baumgartner-like relative consistency proof of a fragment PFA: If κ is a strongly unfoldable cardinal, then there is a model in which kappa is indestructible by all $<\kappa$-closed, κ^+-preserving forcing notions; and there is a model in which PFA holds for forcing notions that preserve either $\aleph_2$ or $\aleph_3$.

This is joint work with Joel David Hamkins.

Thomas Johnstone
New York City College of Technology (USA)

Week 1, Monday June 15, 16:30–16:55

On definability of some counterexamples in descriptive set theory

It is known since early studies on constructibility and forcing that counterexamples to some classical theorems of descriptive set theory consistently exist at suitable projective levels.

This includes, e.g.,

(1) a non-measurable Δ^1_2 set
(2) a nonconstructible Δ^1_3 real
(3) sets that witness failure of Separation for Π^1_3,

and many more.

This naturally led to a question whether counterexamples consistently exist at n-th level of the hierarchy under the assumption that they do not exist at levels below n. Some results in this direction, for arbitrary n, related to definable nonconstructible reals, prewellorderings, Separation, Reduction, are known since mid-1970s, mainly to Leo Harrington, but remain unpublished. The main goal of the talk will be to present proofs of these theorems up to major details, and explain related difficulties.

No general results like this are known so far for measurability and other regularity properties. Although the steps from $n = 2$ to $n = 3$ and from $n = 3$ to $n = 4$ have been resolved by methods that do not generalize to higher levels.

Some other open problems will be discussed.

Vladimir Kanovei
Institute for Information Transmission
Problems, Moscow (Russia)

Week 2, Tuesday June 23, 15:15–16:05

Different ways to produce non-special ω_2-Aronszajntrees

The consistency strength of "no ω_2-Suslin trees" is still open, but the consistency strength of "no non-special ω_2-Aronszajn trees" is known to be a weakly compact. We discuss some statements in between those two and give some results about special and non-special ω_2-Aronszajn trees respectively. We might also mention some related results if time allows.

Bernhard Koenig

Week 1, Friday June 19, 11:10–11:35   *University of Toronto (Canada)*

The Weak Reflection Principle Versus the Reflection Principle

The *Weak Reflection Principle* for ω_2 is the statement that for every stationary set $S \subseteq P_{\omega_1}(\omega_2)$, there is an uncountable ordinal α in ω_2 such that $S \cap P_{\omega_1}(\alpha)$ is stationary in $P_{\omega_1}(\alpha)$. The *Reflection Principle* for ω_2 is the statement that for every stationary set $S \subseteq P_{\omega_1}(\omega_2)$, there is an ordinal α in ω_2 with cofinality ω_1 such that $S \cap P_{\omega_1}(\alpha)$ is stationary in $P_{\omega_1}(\alpha)$. A long outstanding problem in set theory has been the question whether the Weak Reflection Principle for ω_2 implies the Reflection Principle for ω_2. In this talk I will discuss my recent solution to this problem.

John Krueger

Week 1, Monday June 15, 14:10–15:00   *University of California, Berkeley (USA)*

Partitions and Indivisibility Properties
of Countable Dimensional Vector Spaces

(Joint work with Lionel Nguyen Van The, Norbert Sauer)

We investigate infinite versions of vector and affine space partition results, and thus obtain examples and a counterexample for a partition problem for relational structures. In particular we provide two examples of an age indivisible relational structure which is not weakly indivisible.

Claude Laflamme

Week 2, Thursday June 25, 15:15–16:05   *University of Calgary (Canada)*

Universally measurable sets in generic extensions

A subset of a topological space is said to be universally measurable if it is measured by the completion of each countably additive finite Borel measure on the space, and universally null if it has measure zero for each such atomless measure. In 1908, Hausdorff proved that there exist uncountable universally null sets, and thus that there exist at least continuum many. Laver showed in the 1970's that consistently there are just continuum many universally null sets. The question of whether there exist more than continuum many universally measurable sets was asked by Mauldin in 1978. We show that consistently there exist only continuum many universally measurable sets. Many interesting questions about the class of universally measurable sets remain open.

Paul Larson

Week 1, Tuesday June 16, 08:50–09:40   *Miami University (USA)*

Generic constructions of Banach spaces

The aim of this talk is to present a forcing construction "à la Cohen" of generic Banach spaces. These spaces are Gurarij spaces, and in the case of the non-separable context, they can be non-isomorphic. These constructions can also be used to distinguish the existence of different kind of uncountable biorthogonal-like sequences. This is a joint work with S. Todorčević.

Jordi Lopez-Abad
Instituto de Ciencias Matemáticas (CSIC),
Week 2, Monday June 22, 11:20–12:10   *Madrid (Spain)*

Eventually Different Forcing
at the Second Level of the Projective Hierarchy

There is a general connection between notions of forcing adding real numbers and notions of measurability on the real line. Using general results by Ikegami on the relationship between the measurability of Δ^1_2 and Σ^1_2 sets and the existence of quasi-generics over models of the type $L[x]$, we characterize the statements "every Δ^1_2 set has the Baire property in the eventually different topology" and "every Σ^1_2 set has the Baire property in the eventually different topology". This is joint work with Jörg Brendle (Kobe).

Benedikt Löwe
Week 1, Wednesday June 17, 11:00–11:50   *University of Amsterdam (Netherlands)*

Cofinal types of definable directed orders

We discuss some recent developments in the theory of cofinal similarity types of definable directed orders. We detail the relevant techniques: definable Tukey maps, perfect set theorems and Ramsey methods.

Tamás Mátrai

Week 2, Tuesday June 23, 16:30–17:20   *University of Toronto (Canada)*

Metric structures and applications to the theory of topological groups

It has long been known that the automorphism group of a countable first-order structure is (isomorphic to) a closed subgroup of S_∞, and conversely any such group is(isomorphic to) the automorphism group of some countable first order structure (which can also assumed to be relational and ultrahomogeneous). This has led to an interesting interplay between model theory and the descriptive theory of actions of subgroups of S_∞. In this talk, we will explain how the concept of metric structure (as introduced by Ben Yaacov, Berenstein, Henson and Usvyastov) leads to a similar interplay between so-called continuous logic and the descriptive theory of Polish groups and their actions.

We will in particular explain why this leads to an extension of the concept of ample generics (introduced by Kechris and Rosendal) and present examples and applications of this new concept. Finally, if time allows, we will discuss some related open questions.

Julien Melleray

Week 2, Tuesday June 23, 11:20–12:10   *University of Lyon (France)*

Proper translation

This is joint work with S. Shelah. We continue our work on weak diamonds. We show that $2^\omega = \aleph_2$ together with the weak diamond for covering by slaloms, the weak diamond for covering by meagre sets, the weak diamond for covering by null sets, and "all Aronszajn trees are special" is consistent relative to ZFC. We iterate alternately forcings specialising Aronszajn trees without adding reals (the NNR forcing from the Proper Forcing book) and $< \omega_1$-proper forcings adding reals. We show that over a tower of elementary submodels there is a sort of a reduction ("proper translation") of our iteration to the c.s. iteration of simpler iterands. If we use only Sacks iterands and NNR iterands, this allows us to guess the values of Borel functions into small trees and thus derive the mentioned weak diamonds.

Heike Mildenberger

Week 1, Thursday June 18, 14:10–15:00   *KGRC, University of Vienna (Austria)*

Forceless, ineffective, powerless proofs of descriptive set-theoretic dichotomy theorems.

Since its inception, the study of definable subsets of the real numbers has been dominated by a variety of structural dichotomy theorems. In recent times, the proofs of these theorems have grown increasingly complex and dependent upon techniques from mathematical logic. We will discuss an approach to giving classical proofs of these results which is motivated by ideas from graph theory.

Ben Miller

Week 2, Friday June 26, 10:15–11:05

Towers in Boolean algebras

A *tower* in a BA A is a strictly increasing sequence of regular length of elements of A, with sum 1. $\mathfrak{t}_{\mathrm{spect}}(A) = \{|X| : X$ is a tower in $A\}$, and $\mathfrak{t}(A) = \min \mathfrak{t}_{\mathrm{spect}}(A)$. Note that $\mathfrak{t}(A)$ is not defined for every BA.

We survey what is known about these functions in arbitrary BAs. Partly these results concern other cardinal functions generalized from the continuum cardinal case: $\mathfrak{p}(A) = \min\{|X| : \sum X = 1$ and $\sum F \neq 1$ for every finite $F \subseteq X\}$; $\mathfrak{a}(A) = \min\{|X| : X$ is a partition of unity in $A\}$; $\mathfrak{s}(A) = \min\{|X| : X$ splits $A\}$ (which means that for every nonzero $a \in A$ there is an $x \in X$ such that $a \cdot x \neq 0 \neq a \cdot -x$).

Results whose proofs are sketched:

(1) There is an atomless BA A such that $\mathfrak{p}(A) < \mathfrak{t}(A)$.
(2) For $\aleph_0 < \kappa < \lambda$ regular, there is an atomless BA A such that $\mathfrak{s}(A) = \mathfrak{t}(A) < \mathfrak{a}(A)$.
(3) There is an atomless interval algebra A such that $\mathfrak{a}(A) < \mathfrak{t}(A)$
(4) If M is a nonempty set of regular cardinals, then there is an atomless BA A such that $\mathfrak{t}_{\mathrm{spect}}(A) = M$.
(5) We give a characterization of those linear orders whose interval algebras have towers.
(6) A similar characterization is known for pseudo-tree algebras, and we sketch the special case of tree algebras.

J. Donald Monk
Week 1, Friday June 19, 10:05–10:55   *University of Colorado, Boulder (USA)*

A reflection principle with the continuum large (2)

As an application of the results presented by D. Asperó in the previous talk, I will show how to prove that some strong failures of weak club guessing are consistent with the continuum being arbitrarily large. I will also explain how to simplify our forcing construction in some specific cases. This is joint work with David Asperó.

Miguel Angel Mota
Week 1, Tuesday June 16, 16:30–16:55   *University of Barcelona (Spain)*

A universality property
for analytic equivalence relations and quasi-orders

Some years ago, Louveau and Rosendal showed that the relation of bi-embeddability for countable graphs is complete for analytic equivalence relations. This is in strong contrast to the case of the isomorphism relation, which as an equivalence relation on graphs (or on any class of countable structures consisting of the models of an $L_{\omega_1\omega}$-sentence) is far from complete. In this talk I will present a strenghtening of the Louveau-Rosendal result by showing that not only does bi-embeddability give rise to analytic equivalence relations which are complete under Borel reducibility, but in fact any analytic equivalence relation is Borel equivalent to such a relation. This proves that, quite surprisingly, the logic relation of bi-embeddability is able to capture the great complexity of the whole structure of analytic equivalence relations (up to Borel-equivalence). Similar results can also be obtained looking at various notions of morphism naturally arising e.g. in Model Theory and Descriptive Set Theory. Moreover, the techniques introduced allow to answer to some questions posed by Louveau and Rosendal about the possible relationships between isomorphism and bi-embeddability.

This is partially joint work with Sy-David Friedman and Riccardo Camerlo.

Luca Motto Ros

Week 2, Tuesday June 23, 14:10–15:00   *KGRC, University of Vienna (Austria)*

Structural Ramsey theory and topological dynamics

In 2003, Kechris, Pestov and Todorcevic showed that some dynamical properties of closed subgroups of the permutation group of the naturals are closely related to Ramsey-type properties of certain classes of finite structures. This series of talks will present different aspects of this connection via various examples and will focus on the following topics:

- Closed subgroups of S_∞ and countable ultrahomogeneous structures;
- Finite structural Ramsey theory, extreme amenability and universal minimal flows;
- Infinite structural Ramsey theory and oscillation stability.

Lionel Nguyen Van The

Week 2, Tutorial: *University of Neuchatel (Switzerland)*

Wednesday June 24, 11:20-12:10
Thursday June 25, 11:20-12:10
Friday June 26, 11:20-12:10

Playing with countable support iteration

Countable support iteration of definable forcings is often used in Set Theory of the Reals. I'll discuss a game of length ω_1 which seems to be responsible for many combinatorial properties of the generic extension. This is connected to the Parametrized Diamond Principles and developes the Covering Property Axiom.

Janusz Pawlikowski

Week 1, Thursday June 18, 15:15–16:05   *University of Wroclaw (Poland)*

Diamond on successors of singulars

We discuss the work of Shelah, Zeman, Gitik and the speaker concerning diamond on successors of singulars. A few surprising applications would be indicated as well.

Assaf Rinot

Week 1, Thursday June 18, 11:45–12:10   *Tel-Aviv University (Israel)*

Infinite asymptotic games and
an exact Ramsey principle for block sequences

We prove an exact, i.e., formulated without Δ-expansions, Ramsey principle for infinite block sequences in vector spaces over countable fields, where the two sides of the dichotomic principle are represented by respectively winning strategies in Gowers' block sequence game and winning strategies in the infinite asymptotic game. This allows us to recover Gowers' dichotomy theorem for block sequences in normed vector spaces by a simple application of the basic determinacy theorem for infinite asymptotic games.

Christian Rosendal

Week 2, Friday June 26, 15:15–16:05   *University of Illinois, Chicago (USA)*

On forcing with σ-ideals of closed sets

I would like to talk about idealized forcing for σ-ideals generated by closed sets. I will speak about iterations of such forcings and descriptive set-theoretic characterization of conditions in the iteration.

Marcin Sabok

Week 1, Thursday June 18, 16:30–16:55   *University of Wroclaw (Poland)*

On partitions of relational structures

Partition properties of homogeneous relational structures are determined by their automorphism groups. Hence permutation groups closed in the finitary topology have partition properties, lifted from the partiton properties of the underlying homogeneous structures. Those properties can be defined using permutation group notions only. On the other hand due to results of Kechris, Pestov and Todorcevic and Pestov various connections between actions of topological groups on compacta and relational Ramsey theory have become known.

In order to illustrate various of those partition properties and their interrelationships the simpler case of point partitions will be discussed.

Norbert Sauer

Week 2, Wednesday June 24, 09:00–09:50   *University of Calgary (Canada)*

Bounded forcing axioms and reflection

We study mouse reflection in the presence of BPFA, the bounded proper forcing axiom. It turns out that under Woodin's $P_{\max}$ axiom (*), BPFA is equivalent to BMM^{++}, a strong version of bounded Martin's maximum. We also present new information about (†), the statement according to which every stationary set preserving forcing is semiproper.

Ralf Schindler

Week 1, Friday June 19, 14:10–15:00   *Universität Muenster (Germany)*

Thin equivalence relations in scaled pointclasses

We give an inner model-theoretic proof that every thin $\mathbf{\Sigma}_1^{J_\alpha(\mathbb{R})}$ equivalence relation is $\mathbf{\Pi}_1^{J_\alpha(\mathbb{R})}$ if α begins a gap and $J_\alpha(\mathbb{R})$ is admissible, assuming $\text{AD}^{J_\alpha(\mathbb{R})}$. This is joint work with Ralf Schindler.

Philipp Schlicht

Week 1, Friday June 19, 16:30–16:55   *Universität Bonn (Germany)*

Homogeneously Suslin sets in mice with Woodin cardinals

In M_n, the minimal fine-structural iterable proper class model with n Woodin cardinals, all homogeneously Suslin sets are $\mathbf{\Delta}_{n+1}^1$. This talk will describe the main ideas involved in the proof of this fact for $n = 1$.

Farmer Schlutzenberg

Week 1, Monday June 15, 11:10–11:35

Exploring Singular Cardinal Combinatorics

The relationship between the Singular Cardinal Hypothesis, Jensen's square principle, very good scales and large cardinals is important in singular cardinal arithmetic and in understanding how much the universe resembles L. Jensen showed that square holds in L. On the other hand, weak square fails above a supercompact, and implies that every scale is good.

There have also been results about singular cardinals that are not relative consistency results. Using PCF theory Shelah showed that if $2^{\aleph_n} < \aleph_\omega$ for every $n < \omega$, then $2^{\aleph_\omega} < \aleph_{\omega_4}$. Scales are a central concept in PCF theory and are very useful in exploring the tension between combinatorial principles like square and the reflection properties in the presence of large cardinals.

We will discuss relative consistency results about the relationship between these principles in the context of forcing and large cardinals.

Dima Sinapova

Week 1, Tuesday June 16, 11:45–12:10   *University of California, Irvine (USA)*

On properties of families of sets

A set system X is ρ-almost-disjoint iff the intersection of any two elements of X has cardinality less than rho.

For different ρ we prove theorems concerning the chromatic number, the conflict free chromatic number or the essentially disjointness of ρ-almost disjoint set systems.

We will use large cardinals to get consistency results, and we apply Shelah's Revised GCH Theorem to get results in ZFC.

Lajos Soukup

Week 1, Monday June 15, 10:05–10:55   *Hungarian Academy of Sciences*

The Largest Large Cardinal and the Inner Model Hypothesis

Sy Friedman's *Inner Model Hypothesis* (IMH) asserts that every first-order parameter-free sentence in the language of arithmetic that holds in some outer model of V already holds in some definable inner model. In collaboration with Philip Welch and Hugh Woodin, he has shown that the IMH is consistent from a Woodin cardinal with an inaccessible above and has consistency strength at least that of measurable cardinals of arbitrarily high Mitchell order.

The IMH itself is incompatible with large cardinals and implies that the universe is minimal: By a theorem of Beller and Jensen, there exists a real x in any model of the IMH such that $L_\alpha[x]$ does not satisfy ZFC, for all α. For this same reason the IMH cannot be extended to sentences with arbitrary real parameters. (Consider "$\omega_1^{L[x]}$ is countable".)

We consider a variant of the IMH that is compatible with large cardinals, allows real parameters, and does not imply that the universe is minimal. Indeed, if the universe is sufficiently non-minimal, then this variant has a first-order formulation.

Mack Stanley

Week 1, Friday June 19, 15:15–16:05   *San Jose State University (USA)*

Some Consequences of Martin's Conjecture

In this talk, I will explore some of the consequences of Martin's Conjecture on degree invariant Borel maps. These include the strongest conceivable ergodicity result for the Turing equivalence relation, as well as the statement that the complexity of a universal countable Borel equivalence relation always concentrates on a null set.

Simon Thomas

Week 2, Friday June 26, 14:10–15:00   *Rutgers University (USA)*

Nonexistence of universal models
at the successors of singular strong limit cardinals

In joint work with S.D. Friedman, we use interesting properties of some forcings which produce models for a failure of the SCH to show that these models do not have universal graphs at the successors of such singulars.

Katherine Thompson

Week 1, Monday June 15, 17:05–17:30   *KGRC, University of Vienna (Austria)*

The lifting problem for the group of
measure preserving transformations of the unit interval

A measure preserving transformation of the unit interval is an equivalence class of Borel measure preserving bijections that agree almost everywhere. The measure preserving transformations form a Polish group $\mathrm{Aut}([0,1], \lambda)$, which may be considered as a dynamical analogue of the measure algebra. A measure preserving "near-action" of a group G on $[0,1]$ is a homomorphism of G into $\mathrm{Aut}([0,1], \lambda)$.

In this talk we will show that under CH, every near-action can be realized by a point-wise action by Borel measure preserving automorphisms on $[0,1]$. I will then discuss the possibility of having a model in which the near-action of $\mathrm{Aut}([0,1], \lambda)$ on $[0,1]$ itself does not have a point-wise realization, as well as a delimitative result in this direction due to Glasner, Weiss and Tsirelson.

Asger Törnquist

Week 2, Thursday June 25, 16:30–17:20   *KGRC, University of Vienna (Austria)*

Rado's Conjecture, Saturation of the nonstationary ideal on ω_1,
and two cardinal diamonds

We prove that Rado's Conjecture together with the saturation of the nonstationary ideal on ω_1 imply $\Diamond_{\omega_2}$ concentrated on ordinals of uncountable cofinality.

Victor Torres

Week 1, Tuesday June 16, 17:05–17:30   *University of Paris 7 (France)*

Some questions on the models of MM

We will briefly discuss some questions concerning the saturation properties of models of strong forcing axioms (MM, PFA, etc). Caicedo and Velickovic conjectured the following:

Assume MM and let W be an inner model with the same cardinals of the universe V. Then all sequences of ordinals of length $\aleph_1$ are already elements of the inner model W.

We shall discuss the motivations and the ground for the above conjecture as well as some partial results relating the conjecture to certain Ramsey properties and to Shelah's pcf theory.

Matteo Viale
Week 1, Monday June 15, 09:15–09:40   *University of Torino (Italy)*

CCC without random reals

We have known many proper (non-ccc) forcing notions which do not add random reals. We note that a sigma-centered forcing notion is a ccc forcing which does not add random reals.

We introduce two properties of forcing notions, and show that a forcing notion with one of these properties does not add random reals.

This is an extension of Zapletal's paper: Keeping additivity of the null ideal small. Proc. Amer. Math. Soc. 125 (1997), no. 8, 2443–2451.

Teruyuki Yorioka
Week 1, Thursday June 18, 11:10–11:35   *Shizuoka University (Japan)*

Games and σ-porosity

Characterizations of σ-ideals of σ-porous type via infinite games will be presented. Earlier results of J. Zapletal will be our starting point. Using these characterizations we infer some results on inscribing "big" compact sets into "big" analytic sets. This is a joint work with M. Doležal.

Miroslav Zelený
Week 2, Monday June 22, 14:10–15:00   *Charles University, Prague (Czech Republic)*

All lectures will take place in the *Boltzmann Lecture Hall*, second floor of the ESI building. As this lecture hall is not large enough to seat all conference participants, all lectures **except those on Tuesdays after 3 p.m.** will be transmitted by closed circuit tv to *Schroedinger Lecture Hall* (on the same floor). The audience in Schroedinger Hall will be able to see the speaker and the presented slides, but will not be able to ask questions.

Information about KGRC and ESI

There are two venues, which are about 500 m apart:

- KGRC (Kurt Gödel Center, **Währinger Straße 25**: right side entrance — follow signs to Museum, 2nd floor = 2 floors above street level).
- ESI (Erwin Schrödinger International Institute for Mathematical Physics, **Boltzmanngasse 9**, 2nd floor): All talks take place here, starting Monday June 15 at 9:00.

Kurt Gödel Center

Participants are welcome to use the facilities at the KGRC (at Währinger Straße 25) during the day. Services offered include Logic Library services, internet access, fixed public computers and other computer services. There are workspaces for quiet study and space for group work, including blackboards and whiteboards. Coffee and other refreshments will be available.

General KGRC opening times.

- 14:00 - 18:00 on the weekend before, 13 - 14 June
- 8:00 - 18:00 Monday - Friday during the conference

Library opening times.

- 10:00 - 18:00, Monday - Friday during the conference

Computer support (Richard Springer).

- 12:00 - 18:00, Monday, Tuesday, Thursday and Friday during the conference

Public computers and internet access will be available whenever the KGRC is open.

Computers

- WLAN (i.e. wireless internet) is available at the KGRC. To access:
  - Network: `MUW-GUEST`
  - Username: `q077hjac`
  - Password: `3epih2do`
- Fixed public computers and ethernet connections are available
- There are also facilities for printing, photocopying, scanning and faxing

Erwin Schrödinger Institute
Telephone (+43 1) 4277 28282, Fax (+43 1) 4277 28299
email: `secr@esi.ac.at`, WWW: `www.esi.ac.at`

Access: The entrance doors of the ESI are locked on weekends and after 6 p.m. on weekdays. You can get the secret code for entering at the secretaries office. To leave the Institute when the doors are locked, just press the switch with 'door' on it next to the doors. The main entrance door to the street is always open.

Office hours: from 8 a.m. to 6 p.m. on Mo-Fr except holiday.

Telephone: The telephone system of the ESI allows direct access to the visitors' offices by dialing the extension of the office visible on the telephone. Outgoing calls within Vienna are possible from guest offices by dialing 0 before. If you need to call abroad please contact one of the secretaries at the Administration office.

Computer System: An immediately available computer account and an email address can be opened at the Administration office upon your arrival. Information on how to use your own laptop and the ESI computer system can be accessed through the ESI homepage.
`http://www.esi.ac.at/info/computersystem.html`

WLAN: for the duration of the conference the network will be accessible without password. The name of the network is: `eduroam`
Information on how to install eduroam on your computer can be found on:
`http://www.univie.ac.at/ZID/anleitungen-wlan/`

Lecture Announcements and Photo Gallery: Lecture courses and Seminars are announced on the wall on the right side next to the Common Room. Photographs of all current visitors and ESI-members which show their name and home institution as well as Photographs of the ESI-staff are posted on the wall on the left side next to the Common Room.

Mail: A Mail Box for outgoing mail is in the Administration office. The ESI will stamp and send your professional mail. Charges for packages weighing 2 kg or more and mail sent via private Parcel Express Services are not sent or covered by the Institute.

Copier and printer: The copier/printer (named copynix) is located at the end of the main corridor. You do not need an access, simply press the green button. Next to the copier there is the printer (named shredder).

Libraries: Please contact the ESI-Administration to gain access to and information about the Library for Mathematics (Universitätsbibliothek Mathematik, Statistik, Informatik) and the Library for Physics (Österreichische Zentralbibliothek für Physik).

Office supplies: are available in the Administration office.

Financial Matters: concerning financial matters, please contact Isabella Miedl between 11 a.m. and 5 p.m. on Mo-Fr except holidays.

Office space: Offices 21, 22, 24, 25, 26, 27, 29 are reserved for conference participants.