

Speakers

- 1 Nathaniel Bannister
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Abstracts

IMS Graduate Summer School in Logic

(4–20 July 2022)

1 Nathaniel Bannister

Carnegie Mellon University, USA

[Partition Hypotheses and the Additivity of Strong Homology](#)

Abstract

In the 80s, Mardesic and Prasad showed that the continuum hypothesis implies that strong homology is not additive. Recent joint work with Jeffrey Bergfalk, Justin Moore, and Stevo Todorćević shows that it is consistent with a weakly compact cardinal that strong homology is additive and defines a collection of partition hypotheses responsible for this result. We will outline the recent results and the consequences of these partition hypotheses.

2 Tatsuya Goto

Kobe University, Japan

[Two problems concerning Hausdorff measures and the Lebesgue measure](#)

Abstract

I will talk about 2 topics around measures and set theory. One is cardinal invariants on Hausdorff measures. Cardinal invariants defined by the null ideal and the meager ideal have been well studied for a long time and are summarized in Cichon's diagram. We consider cardinal invariants defined by Hausdorff measures, which do not appear in Cichon's diagram, and investigate their relationships.

The other topic is Goldstern's theorem, which states that the union of a real-parametrized, increasing family of Lebesgue measure zero sets has also Lebesgue measure zero provided that the sets are uniformly Σ_1^1 . Our aim is to study to what extent we can drop the Σ_1^1 assumption.

3 Fariza Rakymzhankyzy

Kazakh-British Technical University, Kazakhstan
[Generalized computable numberings](#)

Abstract

I will talk about the notion of a computable numbering of different families relative to an arbitrary oracle. The questions concern primarily universal computable numbering, Friedberg numbering and minimal cover.

4 Isabella Scott

University of Chicago, USA
[Existentially closed groups as a bridge between computability theory, model theory, and algebra](#)

Abstract

Existentially closed structures arose naturally in model theory in the study of “generic structures” and generalisations of algebraically closed fields. In this talk, I'll focus on existentially closed groups and discuss some of the (surprising?) connections they have to computability theory.

5 Wojciech Wołoszyn

Oxford University, UK
[Usuba's extendible and resurrection](#)

Abstract

The mantle is the intersection of all ground models of the universe. By a result of Usuba, the mantle is a ground in the presence of an extendible cardinal. In his recent work, Goldberg argues that this large cardinal hypothesis

cannot be weakened. I shall discuss these results in the context of the axiom of resurrection, outlining a plan for my research project.

6 Wojciech Wołoszyn

Oxford University, UK

[Modal model theory](#)

Abstract

I shall introduce the subject of modal model theory, a research effort bringing modal concepts and vocabulary into model theory. In modal model theory, one studies a mathematical structure within a category of similar structures, giving rise to mathematically natural notions of possibility and necessity. One can study the category of sets, graphs, groups, fields, orders, or what have you. In this talk, I shall describe some of the results from my joint work with Joel David Hamkins—such as the remarkable expressive power of modal graph theory—as well as some new results from my work supervised by Joel David Hamkins—for example, a theorem on bounding modal validities using independent buttons only.