On a question of Slaman and Steel

Andrew Marks

We consider a question of Slaman and Steel: whether Turing equivalence is an increasing union of Borel equivalence relations none of which contain a uniformly computable infinite sequence. We show this question is connected to problems surrounding Martin's conjecture, and also in countable Borel equivalence relations. In particular, if Slaman and Steel's question has a positive answer, it implies there is a universal countable Borel equivalence relation which is not uniformly universal, and that there is a invariant function from Turing equivalence to many-one equivalence not uniformly invariant on any pointed perfect set. This is joint work with Adam Day.

The Ultrapower Axiom and Ultimate L

Hugh Woodin

The Inner Model Program is the program to generalize Gödel's construction of the inner model L to larger inner models in which large cardinal axioms can hold. This is necessary since by Scott's theorem there are no measurable cardinals in L.

The AD+ Program is the program to analyze the canonical AD+ models provided by the universally Baire sets of real numbers. AD+ is refinement of the Axiom of Determinacy (AD).

These two programs each lead naturally to axioms. Goldberg's Ultrapower Axiom is derived from the Inner Model Program, and the axiom V = Ultimate L is derived from the AD+ Program.

There is a mirror duality in these programs and the conjecture is that the axiom V = Ultimate L must hold in the inner models of the Inner Model Program at the level of supercompact cardinals and beyond, if any such inner models exist.

The recent theorem is that the axiom V = Ultimate L implies the Ultrapower Axiom, confirming a key prediction of the Ultimate L Program.

On normal numbers

Verónica Becher, Universidad de Buenos Aires

Ted Slaman's contributions to the theory of normal numbers stem from his understanding that Computability theory and Diophantine approximation share a perspective on the finite in relation to the infinite. I will discuss these contributions, subsequent investigations, and open questions.

Degree Structures and Decidability

Steffen Lempp, University of Wisconsin-Madison

I will survey older and more recent work on degree structures and the complexity of their first-order theories. My particular focus will be on the decidability of fragments of these theories.

An analytic equivalence relation with an unexpected property

Patrick Lutz, University of California, Berkeley

In his thesis, Tyler Arant introduced and studied the concept of Borel graphability of analytic equivalence relations. Briefly stated, an analytic equivalence relation E on X is Borel graphable if there is a Borel graph on X whose connectivity relation coincides with E. Recently, Tyler Arant, Alexander Kechris and I discovered a surprising phenomenon related to Borel graphability: there is an analytic equivalence relation whose Borel graphability is equivalent to the existence of a non-constructible real. Moreover, this equivalence relation is not an artificial example explicitly designed to have this behavior, but rather one which is familiar to any recursion theorist. I will discuss the context for this result and the main ideas used in the proof. A key tool in the proof is Kumabe-Slaman forcing and I will also briefly discuss the history of this forcing notion along with my own involvement with it.

The minimal α-degree problem revisited

Chi Tat Chong, National University of Singapore

Let α be an admissible ordinal. An α-degree $\mathbf{a} > \mathbf{0}$ is minimal if every $\mathbf{b} < \mathbf{a}$ is equal to $\mathbf{0}$. Spector (1956) invented the method of forcing with perfect sets to construct a set of minimal ω-degree. John Macintyre (1973) extended Spector's theorem to every countable admissible α. Shore (1972) proved the existence of a minimal α-degree whenever α is Σ_2-admissible. The problem of the existence of a minima, α-degree for any α has remained open. We give an overview of this problem and present some recent results.

Definability and randomness - a travelogue

Jan Reimann, Pennsylvania State University

I had the good fortune to meet Ted in 2002 in Heidelberg, Germany. From there, we set out on a journey together that took us about 50000 miles around the world and up a good number of admissible ordinals. Along the way, we discovered a strong orthogonality between algorithmic randomness and stratified hierarchies of definability like the fine structure of the constructible universe. In this talk, I will aim to recount both the journey and the results in chronological order, including a time jump towards the end to present some new directions this journey has taken recently.

Ordinal arithmetic without Σ^0_1 induction

Marcia Groszek, Dartmouth College

In the second edition of *Subsystems of Second Order Arithmetic*, Simpson suggested revisiting results over RCA_0 over the weaker system RCA^*_0. In joint work with Justin Miller and Ben Logsdon, we look at a piece of this program, examining the collection of results in Hirst's "A survey of the reverse mathematics of ordinal arithmetic."

Effective inseparability and c.e. structures

Andrea Sorbi, Università di Siena

We review some applications of the classical notion of effective inseparability to c.e. structures and formal systems. These applications are based on the notion of an effectively inseparable lattice. In particular, every effectively inseparable lattice is uniformly dense and in any nonempty interval of the lattice one can embed every c.e. preorder. We show how to apply these results to the Lindenbaum lattices of sentences of weak arithmetical theories.

A topological game metatheorem

Antonio Montalbán, University of California, Berkeley

In joint work with Andrew Marks, we develop a topological version of the computable-structure game metatheorem. This topological version allowed us to prove some interesting results in Descriptive Set Theory about decompositions of Baire-class functions. In this talk, I plan to introduce this tool and give an idea of how to use it.