SPRING 2004
LOGIC SEMINAR

Friday, January 30, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Eric Ufferman, GWU
Title: *Examples of strongly minimal theories*

Tuesday, February 3, 2004
3:30-4:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Eric Ufferman, GWU
Title: *Examples of strongly minimal theories, Part II*

Friday, February 6, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Ali Enayat, American University
http://academic2.american.edu/~enayat/
Title: *Automorphisms of models of arithmetic*
Abstract: I will give a survey of old and new results concerning automorphisms of models of arithmetic, including recent characterizations of Peano Arithmetic and Second Order Arithmetic in terms of automorphisms.

Friday, February 13, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Ali Enayat, American University
Title: *Automorphisms of models of arithmetic,* Part II

Friday, February 20, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Joel D. Hamkins, College of Staten Island of CUNY and CUNY Graduate Center
http://jdh.hamkins.org
Title: *For infinite time Turing machines, P is not NP*
Abstract: Infinite time Turing machines extend the operation of ordinary Turing machines into transfinite ordinal time. Recently, Ralf Schindler proposed and settled the analogue of *P vs. NP* for these machines, showing that *P* is not equal to *NP* in this context. After this, Schindler, Deolalikar and I extended the analysis to show that P is not even equal to *NP* intersect *coNP* in the infinite time context. After giving an introduction to the machines, I will discuss this proof and some generalizations.

Friday, February 27, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Christopher Shaw, University of Maryland
Title: *Classical o-minimal structures and theories*
Abstract: In the world of definable subsets of structures with a linear order relation, the class of o-minimal structures is the least complicated possible. I will discuss some of the major results since the 70's and 80's and give examples of a few proofs of the type that appear often in the subject.

Friday, March 12, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Valentina Harizanov, GWU
Title: *The Barwise-Kreisel Compactness Theorem*
Abstract: The usual first order logic is compact. That is, if every finite subset of a theory T has a model, then T has a model. Unfortunately, such a compactness result does not hold for infinitary logic. However, with the modification of the notion of "finite" and with some restrictions on the theory, more general versions of compactness hold. The Barwise-Kreisel Compactness Theorem states that if T is a Π^1_1 theory composed of computable infinitary sentences such that every hyperarithmetical subset of T has a model then T has a model. This lecture is closely related to the *Topics in Logic* that I am currently teaching.

Friday, March 26, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Monica VanDieren, University of Michigan
http://www.math.lsa.umich.edu/~mvd/home.html
Title: *Tame Abstract Elementary Classes*
Abstract: Fitting under the umbrella of abstract elementary classes, Rami Grossberg and I introduced tame classes as a natural generalization of excellent and homogeneous classes. In this talk I will define tame classes, survey some stability results and detail our recent proof of Shelah's Categoricity Conjecture for tame abstract elementary classes.

Friday, April 9, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Simon Thomas, Rutgers University
http://www.math.rutgers.edu/~sthomas/
Title: *Asymptotic cones of finitely generated groups*
Abstract: If an observer moves steadily away from the Cayley graph of a finitely generated group, then any finite configuration will eventually become indistinguishable from a single point; but he may observe certain finite configurations which resemble earlier configurations. The asymptotic cone is a topological space which encodes all of

these recurring finite configurations. Unfortunately, the construction of an asymptotic cone involves a number of non-canonical choices, and it was not clear whether the resulting asymptotic cone was independent of these choices. In this talk, partially answering a question of Gromov, I shall consider the question of whether lattices in *SL(n,R)* have unique asymptotic cones up to homeomorphism. The answer turns out to be very surprising! This is joint work with Linus Kramer, Saharon Shelah and Katrin Tent.

Friday, April 23, 2004
2:30-3:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Jennifer Chubb, GWU
Title: *Constructing minimal Turing degrees using function trees*
Abstract: A Turing degree is minimal if it is noncomputable and there is no noncomputable Turing degree below it. There are continuum many minimal Turing degrees. Spector showed the existence of minimal degrees and Sacks proved their existence below the degree of the halting set.

Friday, April 23, 2004
3:30-4:30 p.m.
Funger Hall (2201 G Street), Room 428B
Speaker: Russell Miller, Queens College, CUNY
http://qcpages.qc.edu/math/
Title: *Computable categoricity for trees*
Abstract: A computable structure A is computably categorical if for every computable B isomorphic to A, there exists a computable isomorphism from A onto B. Algebraic descriptions of this property for various specific theories have been developed; for instance, Remmel showed that a linear order is computably categorical iff it contains only finitely many successivities. We consider the question of computable categoricity for trees, in the language of partial orders, and derive an algebraic criterion for it. We also look at the same question for trees under the infimum function, and for trees with an additional downward-closed unary predicate. Portions of the talk represent joint work with Lempp, McCoy, and Solomon, and with Kogabaev and Kudinov.

OTHER LOGIC TALKS

Mathematics Colloquium
Friday, February 6, 2004
1:00-2:00 p.m.
Monroe Hall (2115 G Street), Room 105
Speaker: Poorvi Vora, Department of Computer Science, GWU
Title: *The Security of Randomization*
Abstract: A long-open problem in statistical database security is one of formally characterizing a large class of attacks and providing a measure of security with respect to these attacks. We use a perspective from the theory of secrecy to formulate the problem, and classical results from Shannon information theory to solve it. We thus obtain a mathematical definition of all attacks on, and the privacy measure of, the binary symmetric randomization protocol (flipping a bit with probability *p*). Among the interesting results we obtain are: (a) a correspondence between efficient attacks and channel codes (b) the existence of attacks that achieve zero asymptotic error with merely a constant cost per bit of entropy (c) a tight lower bound on the cost for zero asymptotic error (d) that the cost is the channel capacity of the protocol viewed as a communication channel. We will end by touching on ways in which this approach can be used to design "most efficient" attacks on some other cryptographic primitives.

Mathematics Colloquium
Friday, March 26, 2004
1:00-2:00 p.m.
Monroe Hall (2115 G Street), Room 105
Speaker: Monica VanDieren, University of Michigan
http://www.math.lsa.umich.edu/~mvd/home.html
Title: *Taking Model Theory to the Next Level*
Abstract: Since the mid-fifties, model theory has developed into a rich branch of mathematics answering not only foundational questions, but providing tools to approach problems in other branches of mathematics such as algebraic geometry and number theory. Until recently, most work in model theory concentrated on developing a structural analysis for models of first order theories. Despite the successes of Hrushovski and others in using first-order model-theoretic machinery to resolve problems such as the Mordell-Lang Conjecture for function fields of positive characteristic, first order model theory is inherently limited in its applications since many mathematical problems cannot be axiomatized by first order logic.

In the mid-seventies Shelah initiated a program (classification theory for abstract elementary classes) to extend the scope of model theory to classes which cannot be axiomatized by first-order logic. In this talk I will discuss the status of this program and describe my recent joint work with Rami Grossberg on Shelah's Categoricity Conjecture which has long served as a benchmark for progress in the classification theory for abstract elementary classes.

Mathematics Colloquium
Friday, April 9, 2004
10:30-11:30 p.m.
Monroe Hall (2115 G Street), Room 105
`Speaker:` Simon Thomas, Rutgers University
http://www.math.rutgers.edu/~sthomas/
`Title:` *Cayley graphs of finitely generated groups*
`Abstract:` We shall explain why there does not exist an explicit choice of generators for each finitely generated group with the property that isomorphic groups are assigned isomorphic Cayley graphs.