

CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, February 27

2:00 – 3:00 PM

Maria Sanford, Room 101

CAN COMPUTERS DO MATH? AN INTRODUCTION TO COMPUTABILITY THEORY AND EFFECTIVE MATHEMATICS

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Abstract: In this talk we will have fun with mathematical logic. We will start with self-reference and recursion, two ideas that appear in paradoxes like the sentence “This sentence is false” and the set of all sets that do not contain themselves. Self-reference and recursion are also found in computability theory, one of today’s active areas of logic. Computability theory is the study of sets of natural numbers from the viewpoint of Turing machines, which are idealized computers allowed to have arbitrarily large memory and infinite runtime. Despite this apparent computational advantage, however, there are sets of natural numbers (e.g., the halting set) for which membership cannot be determined by these computers. Finally, we will apply computability theory to another area of mathematics, namely, graph theory. We will see how to view graphs and a certain graph-theoretic feature (specifically, the domatic number of a graph) from the perspective of algorithms and computer programs.

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