

CCSU  
DEPARTMENT OF MATHEMATICAL SCIENCES

# COLLOQUIUM

Friday, March 27  
2:00 – 3:00 PM  
Maria Sanford, Room 101

## CONSTANT-SPEED RAMPS FOR A CENTRAL FORCE

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(Joint work with Rafael Lopez from Universidad de Granada)

**Abstract:** Anytime the coefficient of friction between a plane and a block is known, it is easy to show that, if we inclined the plane the right amount, then the block will slide down along the planar ramp with constant speed. In 2015, the author classified all the shapes of the ramps with the property that a block will move with constant speed. In this talk we discuss the shape of the ramps with this property when the force acting on the block is not the gravitational force but a central force. We classify all the ramps when the central force is inversely proportional to the distance to the center.

The talk explains the set of tools used to solve the differential equation that models the problem being considered. In particular we will be using the phase portrait of a two by two linear systems and the phase portrait of a two by two quadratic systems and the notion of ThreadmillSled, previously discovered by the author. The solutions include circles and logarithmic spirals.

**For further information:**  
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