

CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, September 26

3:00 – 4:00 PM

Maria Sanford, Room 101

FOLDING CARPENTER'S RULES, ROBOT ARMS, PROTEINS: FROM GEOMETRY TO COMBINATORICS

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ABSTRACT

The Carpenter's Rule problem, first appearing in the topology community in the mid '70s and then in Computer Science in the '90's as a robot arm motion planning problem, asks whether every simple planar polygon with fixed edge lengths can be reconfigured continuously between two positions, without producing any self-intersections along the way. The solution is a mixture of ideas from geometry, rigidity theory and polyhedral combinatorics, all leading to a curious (but nice and friendly) object, called a pseudo-triangulation.

A main attraction of this talk is its graphical appeal: every concept I define is elementary, depicted graphically (with lots of two- and three-dimensional props) and easy to understand. The "protein" part of the title leads to the future, to one of the major problems in science today (protein folding): I will conclude telling you what the connection between folding a robot arm and a protein is, and where this research is leading to.

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