

Program for Mechanical Puzzles Day at Dartmouth

Tuesday, February 19, 2008

LOCATION: Kemeny Hall, Room 008

1:00 Registration (downstairs in Kemeny Hall)

1:30 Introduction and Welcome

1:45 talk by **Jerry Slocum** (title and abstract below)

2:30 talk by **Stewart Coffin** (title and abstract below)

3:15 talk by **George Hart** (title and abstract below)

4:00 break

4:30 talk by **Oskar van Deventer** (title and abstract below)

5:15 talk by **Bill Cutler** (title and abstract below)

6:00 talk by **Tom Lensch** (title and abstract below)

7:00 reception and PUZZLE PARTY in Kemeny 300
(Party will have food and non-alcoholic beverages—and puzzles!)

Abstracts

Early Mechanical Puzzles 10th Century B.C. to 19th Century

Jerry Slocum

This paper will show examples of the many different types of mechanical puzzles that were designed and produced worldwide from the 10th century B.C. to the 19th century. The puzzles described include six types of mechanical puzzles. For put-together puzzles, where the problem is to assemble a set of given pieces into specified shapes, the Stomachion by Archimedes in 250 B.C. was the first known puzzle in this category. Trick locks, cabinets with secret compartments and secret opening boxes are early examples of early take-apart puzzles. Interlocking burr puzzles were first shown in an engraving in the 17th century and string puzzle were described in Italy in 1500. Puzzle Vessels were created in the 10th century B.C. on the island of Cyprus. And puzzles that appear impossible, such as magic mirrors, were created over 2000 years ago in China.

Misdirection-Type Puzzles

Stewart Coffin

Misdirection-type puzzles appear to suggest one sort of solution but actually require another. This talk will be based on Chapter 3 of Coffin's book, *Geometric Puzzle Design*.

Sculpture Puzzles

George W. Hart

A series of novel sculpture-puzzles is illustrated, with mathematical explanation. Each consists of a set of identical parts that snap together into a symmetric form. The parts are flat, so they can be cut out or stamped from sheet materials such as wood, metal, plastic, or cardboard. High accuracy is required for the parts to mate properly, so computer-controlled fabrication technologies are useful. Examples will be shown made by laser-cutting, by solid freeform fabrication techniques, or by scissors and paper. Their intricate geometric forms make for challenging assembly puzzles and attractive artworks.

Puzzling Mechanisms

M. Oskar van Deventer

The basis of a good mechanical puzzle is often a puzzling mechanism. This presentation will introduce some new puzzling mechanisms, like two knots that engage like gears, a chain whose links can be interchanged, and flat gears that do not come apart. It will be illustrated how puzzling mechanisms can be transformed into real mechanical puzzles, e.g. by introducing a maze structure. Also,

the concept of a “large base-line puzzle” is introduced, resulting in (arguably) the largest mechanical puzzle in the world.

Designing Puzzles with a Computer

William Cutler

The talk will cover puzzles that Cutler has designed over the years using a computer. A computer analysis of all 6-piece burrs was done from 1987 to 1990, resulting in some startling new burr designs. Other famous puzzles whose design made use of the computer include Bill’s Baffling Burr, Boxed Box, and Splitting Headache.

Making Exotic Puzzles

Tom Lensch

Many early puzzle designs were straightforward in the way they were designed and made. Even though they had different shapes, they were made from basic square cuts and notches. However, many modern puzzle designs by “present company included” (i.e., Oskar, Stewart and Bill) require complex jigs and a variety of complex angles for cutting puzzle pieces. Engineering background has helped the speaker immensely in crafting these designs.