Geometric Puzzles: Algorithms and Complexity

Speaker:
Erik Demaine,
Massachusetts Institute of Technology

Bullitt Lecture
from the
Department of Mathematics,
University of Louisville

6:30 - 7:30 p.m.
Thursday
March 29, 2012

Middleton Auditorium
Strickler Hall 101

Free and Open to the Public

I love geometry because the problems and solutions are fun and often tangible. Puzzles are one way to express these two features, and are also a great source of their own computational geometry problems which puzzles can be solved and/or designed efficiently using computer algorithms? Proving puzzles to be computationally difficult leads to a mathematical sort of puzzle, designing gadgets to build computers out of puzzles. I will describe a variety of algorithmic and computational complexity results on geometric puzzles, focusing on more playful and recent results.

Erik Demaine is a Professor in Computer Science at the Massachusetts Institute of Technology. Demaine's research interests range throughout algorithms, from data structures for improving web searches to the geometry of understanding how proteins fold to the computational difficulty of playing games. He received a MacArthur Fellowship (2003) as a 'computational geometer tackling and solving difficult problems related to folding and bending—moving readily between the theoretical and the playful, with a keen eye to revealing the former in the latter'. Erik cowrote a book about the theory of folding, together with Joseph O'Rourke (Geometric Folding Algorithms, 2007), and a book about the computational complexity of games, together with Robert Hearn (Games, Puzzles, and Computation, 2009). His interests span the connections between mathematics and art, including curved origami sculptures in the permanent collection of the Museum of Modern Art (MoMA), New York.