

THE MATHEMATICS DEPARTMENT PRESENTS  
A MATHEMATICS COLLOQUIUM

THURSDAY, May 24, 2007  
BOND HALL 227  
4:00 pm

Title: **X-rays of Planar Convex Bodies**

Speaker: **Mark Lockwood**, Western Washington University

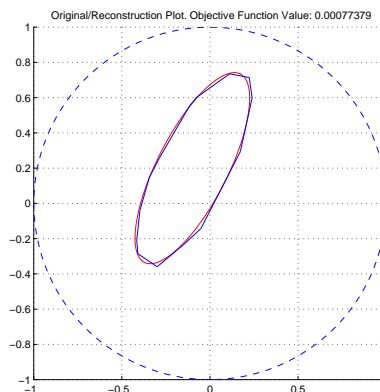
**Abstract:** In 1961, P. C. Hammer posed the following problem:

*Suppose there is a convex hole in an otherwise homogeneous solid and that X-ray pictures taken are so sharp that the “darkness” at each point determines the length of a chord along an X-ray line. (No diffusion, please.) How many pictures must be taken to permit exact reconstruction of the body if:*

- a. The X-rays issue from a finite point source?*
- b. The X-rays are assumed parallel?*

This talk is intended to present a solution of Hammer’s problem for the case of parallel X-rays. It will start with a description of the conditions needed on collections of “X-ray pictures” which permit the reconstruction of convex bodies, followed by the introduction of an algorithm for reconstructing arbitrary convex bodies from their X-rays (with noise considered!).

In addition, I will sketch a proof of the convergence of this algorithm, and even demonstrate a program I wrote which implements this procedure.



Refreshments will precede the talk at 3:30pm in Bond Hall 300  
courtesy of Richard Gardner.