

WICHITA STATE UNIVERSITY

Department of Mathematics and Statistics

*The Lecture Series in the
Mathematical Sciences Presents Our Guest:*

Prof. Li-tien Cheng

University of California, San Diego

*"Advances of the Level Set Method for
Geometrical Optics"*

Abstract:

Geometrical optics refers to a high frequency approximation simplifying the wave equation. In this regime, the wave equation is reduced to equations for two quantities: the phase and the amplitude. Solving for phase and amplitude have become the main issues for those working in the field. The common strategy for capturing the phase is to construct its level sets, known as wavefronts, following its equation, known as the eikonal equation.

In the past, two major obstacles have impeded this approach. One concerns capturing wavefronts to adequate resolution and the other concerns capturing the multi-valuedness commonly exhibited by wavefronts.

Algorithms in the field are traditionally able to easily bypass one of these obstacle but end up with difficulties with the other. A recent breakthrough by Engquist, Runborg, Tornberg, however, instituted a framework that solves both issues in a natural way. Subsequently, Osher et al imported the level set method into the framework for a new approach. This talk centers on this approach, its capabilities, and recent advances in the regimes of surface rays, reflection, and refraction.

**Friday, November 11, 2005
3:00 PM in 372 Jabara Hall**

*Please come join us for refreshments before the lecture
at 2:30 p.m. in room 353 Jabara Hall.*