

WICHITA STATE UNIVERSITY
Department of Mathematics and Statistics

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

Prof. Robert Lipton
Louisiana State University

*“Bounds on the distribution of extreme values for the stress in
composite materials.”*

Abstract:

In many cases failure in a composite medium can be related to the elastic stress field at the time of initiation. Motivated by this we examine the distribution of extreme values for the stress in the linear elastic regime. The focus is to assess the likelihood that the magnitude of the stress inside a loaded composite exceeds a nominal value. A homogenized quantity dubbed the macro stress modulation function is introduced. One considers a cube situated inside the composite material. The volume fraction of the cube over which the Von Mises equivalent stress is larger than t is denoted by $P(t)$. The analysis focuses on the case when the scale of the microstructure is sufficiently fine relative to the wavelength of the loading. A rigorous upper bound on $P(t)$ is found. This bound is exponentially decreasing with t and is given in terms of the BMO norm of the macro stress modulation function over the cube.

Friday, April 11, 2003
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.*