

WICHITA STATE UNIVERSITY  
Department of Mathematics and Statistics

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

Prof. Hari Mukerjee  
Wichita State University

*“Statistical Inferences for a Decreasing Mean Residual  
Life Distribution”*

Abstract:

In survival analysis and in the analysis of life tables an important biometric function of interest is the life expectancy at age  $x$ ,  $M(x)$ , defined by

$$M(x) = E[X - x | X > x],$$

where  $X$  is a life distribution, i.e.,  $X \geq 0$ .  $M$  is called the mean residual life function (MRLF). Grace Yang (1978) produced an empirical estimator,  $M_n$ , of  $M$ , showed that it is strongly uniformly consistent, and that  $\sqrt{n}[M_n - M]$  converges weakly to  $Z$ , a mean-zero Gaussian process.

In many applications it is reasonable to assume that  $M$  is decreasing. A few years ago I gave a talk on an estimator,  $M_n^*$ , of  $M$  under this order restriction, showed that it is strongly uniformly consistent, and that  $\sqrt{n}[M_n^* - M]$  converges to  $Z$ , the same Gaussian limit as in the unrestricted case, but under some heavy analytic assumptions on  $M$  (Kochar, Mukerjee and Samaniego, Annals of Statistics, 2000, 905-920.). In this talk we generalize the weak convergence results with none of these analytic assumptions, and provide some asymptotic confidence intervals and tests for a decreasing mean residual life distribution. In particular, we show that the mean square error of  $M_n^*$  is less than or equal to that of the unrestricted estimator,  $M_n$ . *This is joint work with Edgardo Lorenzo.*

Friday, November 14, 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.*