STANFORD UNIVERSITY
DEPARTMENT OF STATISTICS
DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, April 22, 2008
Sequoia Hall Room 200
(Cookies at 3:45 in 1st Floor Lounge)

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The Role of Reversals in Statistical inference: Two Vignettes

I. Reversing Monotonicity in Order-restricted Inference.

An order-restricted statistical model can be viewed as one whose parameter space is a closed convex cone C in a Euclidean space. Order-restricted likelihood ratio tests and maximum likelihood estimators have been criticised on the grounds that they may violate a "cone-order monotonicity" (COM) property relative to C; instead they may "reverse" the cone-order. It is argued here, however, that these reversals occur only in the case that C is an *obtuse* cone, and that in this case COM is an inappropriate requirement for order-restricted tests and estimates. The likelihood ratio test and maximum likelihood estimator remain perfectly reasonable procedures for order-restricted inference.

2. Reversing the Stein Effect.

The *Reverse Stein Effect* is identified and illustrated: A statistician who shrinks his/her parameter estimate toward a point based on the observed data rather than on reliable prior information will not be protected by the minimax property of shrinkage estimators such as that of James and Stein. The curvature of high-dimensional space that produces the classical Stein Effect works here almost exactly in reverse - a shrinkage estimator will likely incur a much greater error than the ordinary (best invariant) estimator.

Joint work with Sanjay Chaudhuri, National University of Singapore