

Colloquium  
Michigan State University  
Department of Statistics and Probability

Heng Wang  
Research Associate  
Department of Animal Science  
Michigan State University

**Testing a Union-of-Cones Null Hypothesis for the  
Identification of Heterosis**

Tuesday, January 8, 2013  
10:20 a.m. - 11:10 am  
Refreshments 10:00 am  
C405 Wells Hall

Abstract:

High-parent or low-parent heterosis is a genetic phenomenon that occurs when the mean trait value of offspring is more extreme than that of either parent. We discuss statistical tests that can be used to detect heterosis of this type. The null hypothesis of no high-parent or low-parent heterosis constrains a vector of mean parameters to a union of two closed convex cones. This unusual null parameter space leads to a non-standard testing problem for which we derive both the likelihood ratio test and the intersection-union test. Although these tests are often equivalent, we show that the likelihood ratio test is preferred over the intersection-union test in this case. Moreover, we also discuss the possibility of developing a test uniformly more powerful than the likelihood ratio test. Although such tests are of theoretical interest, we ultimately recommend the likelihood ratio test for use in practical applications.

*To request an interpreter or other accommodations for people with disabilities, please call the Department of Statistics and Probability at 517-355-9589.*