## DIAGNOSING DISEASE RISK AND ASSESSING THE PROPERTIES OF DIAGNOSTIC MEASURES FOR THE PROTECTION OF ANIMAL AND HUMAN HEALTH: A BAYESIAN SEMI-PARAMETRIC APPROACH TO DIAGNOSIS AND TO ROC CURVE ESTIMATION

## A. Branscum

University of California, Davis, CA, USA

<sup>†</sup>E-mail: ajbranscum@ucdavis.edu

Diagnostic testing is essential for monitoring and detecting infections in animal populations. This is especially true for those infections that might impact on public health or the economy. Two standard approaches involve the use of continuous serologic data to: (i) characterize the performance of diagnostic procedures and to (ii) make inferences for the probability of disease. Our approach involves a more efficient use of data than standard approaches that dichotomize based on a threshold or cutoff. In the standard approach, individuals with serologic scores above the cutoff are assigned the same probability/risk of disease, regardless of the magnitudes of their individual values. However, modeling the non-dichotomized data provides probabilities of disease across a range of serologic values. In this talk we use Bayesian semi-parametric methods for making inferences about disease risk, receiver operating characteristic curves, and prevalence, with the possibility of covariates, and all based on a single sample of serologic outcomes with unknown disease status. The talk is framed by discussion of Johne's disease detection.