DEPARTMENT OF MATHEMATICS MASTER THESIS DEFENSE

University of Central Arkansas™

Speaker: **Camille Dollins, Graduate Student Department of Mathematics**

Title: **An Evaluation of Breast Radiological Density Assessment by <u>Quantra</u> Software as Compared to Visual Classification**

Date: **Friday, April 24, 2015**

Time: **10:00—11:00 a.m.**

Place: **MCS 211**

Breast density is a known risk factor in the development of breast cancer. Breast density is determined based on visual readings by radiologists using American Society of Radiology Bi-RADS density method, and therefore subjective. A way of measuring breast density numerically is computing the percent density using software. This thesis compares the qualitative readings by radiologists to quantitative readings by <u>R2</u> <u>Quantra</u> <u>Hologic</u> computerized software of the same mammograms in order to establish an objective cutoff for categorizing breast density. Receiver Operating Characteristic (<u>ROC</u>) curves and logistic regression models are used to find the best cutoff <u>Quantra</u> density value to separate the low (<u>D1</u>/<u>D2</u>) density from the high density (<u>D3</u>/<u>D4</u>). Using a race indicator provided, the best cutoff values are also found for <u>Quantra</u> densities of African-American and Caucasian patients. Survival analysis is performed on simulated survival data to demonstrate how to find the best <u>Quantra</u> density cutoff value to distinguish between high risk and low risk groups. This analysis is done using <u>Kaplan</u>-Meier curves and Cox Proportional Hazards (PH) models.