# West Virginia University

## SCHOOL OF PUBLIC HEALTH

# Department of Biostatistics

## Monthly Seminar Series

Thursday, November 16, 2017

2:45pm – 4:00pm

G274 (near south side elevators)

## Speaker:

Eugenie Jackson, PhD

Research Associate, Biostatistics

## Topic:

# Two Recent Algorithms to Infer Structure in Longitudinal Vaginal Microbiome Data

## Abstract:

The purpose of this talk is to give an overview of some of the research I have done, emphasizing my most recent work evaluating software designed to infer structure in longitudinal vaginal microbiome data. The study of microbial communities inhabiting human body sites has been an important area of research since their discovery. In the last 20 years, sequencing technologies have been developed that allow culture-free identification of community members. These communities are recognized for their important roles in the maintenance of good health and in the development of disease. Human Microbiome Projects 1 and 2, supported by the National Institutes of Health, have been instrumental in advancing these studies. My research focuses on the bacterial communities specific to the human vagina, known as the vaginal microbiome. The data are characterized as sparse, high-dimensional, compositional, typically contaminated, and frequently involving more taxa than observations. These features necessitate the development of new methods for exploration and inference. The assessments of 2 promising algorithms are presented. BioMiCo (Bayesian inference of microbial communities), a supervised learning algorithm based on a hierarchical Bayesian model that infers an interpretable latent assemblage structure is considered first, followed by CORAL (Clustering and Ordination Regression AnaLysis), an unsupervised algorithm that classifies and clusters microbial data. Experiments designed to assess the capabilities and limitations of these algorithms when applied to longitudinal data are performed and recommendations are made.