# THE UNIVERSITY OF GEORGIA
# DEPARTMENT OF STATISTICS

# Colloquium Series


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**Zoom link: https://zoom.us/j/7979236528**

## A new change point analysis problem motivated by a liver procurement study


Literature on change point analysis mostly requires a sudden change in the data distribution, either in a few parameters or the distribution as a whole. We are interested in the scenario where the variance of data may make a significant jump while the mean changes in a smooth fashion. The motivation is a liver procurement experiment monitoring organ surface temperature. Blindly applying the existing methods to the example can yield erroneous change point estimates since the smoothly-changing mean violates the sudden-change assumption. We propose a penalized weighted least squares approach with an iterative estimation procedure that integrates variance change point detection and smooth mean function estimation. The procedure starts with a consistent initial mean estimate ignoring the variance heterogeneity. Given the variance components the mean function is estimated by smoothing splines as the minimizer of the penalized weighted least squares. Given the mean function, we propose a likelihood ratio test statistic for identifying the variance change point. The null distribution of the test statistic is derived together with the rates of convergence of all the parameter estimates. Simulations show excellent performance of the proposed method. Application analysis offers numerical support to non-invasive organ viability assessment by surface temperature monitoring. Extension to functional variance change point detection will also be presented if time allows.