

# COLLOQUIUM ANNOUNCEMENT

“GLR Control Charts for Monitoring Multivariate Normal Processes”

Presented by

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300 Seitz

3:30 p.m.

**Abstract:** In many manufacturing processes, the quality of the output is measured by more than one characteristic. Inevitably, unwanted incidents will always occur in the process and bring it to out of control. Statistical process control (SPC) charts are graphical tools used to quickly detect any changes in the underlying distribution. This work discusses a control chart based on a generalized likelihood ratio (GLR) statistic to monitor the mean vector of a multivariate normal process. The performance of the GLR chart is compared to the performance of the Hotelling  $\chi^2$  chart, the multivariate exponentially weighted moving average (MEWMA) chart, and a multi-MEWMA combination. Results show that the Hotelling  $\chi^2$  chart and the MEWMA chart are only effective for a small range of shift sizes in the mean vector, while the GLR chart and some carefully designed multi-MEWMA combinations can give similarly better overall performance in detecting a wide range of shift magnitudes. Unlike most of these other options, the GLR chart does not require specification of tuning parameter values by the user. The GLR chart also has the advantage in process diagnostics: at the time of a signal, estimates of change-point and out-of-control mean vector are immediately available to the user. All these advantages of the GLR chart make it a favorable option for practitioners. For the design of the GLR chart, a series of easy to use equations are provided to users for calculating the control limit to achieve a desired in-control ATS. The GLR procedure has also been applied to the problem of monitoring the covariance matrix and is shown to give similar advantages.



Hosted by the  
Department of Statistics  
Virginia Tech

Please join us after the colloquium for refreshments at  
Top of the Stairs (217 College Ave.)