

# R. Clifton Bailey Statistics Seminar Series

## *Dependency Discovery via Multiscale Graph Correlation*

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Engineering Building – Room 5117, Dean’s Conference Room

4400 University Drive, Fairfax, VA 22030

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11:00 A.M. - 12:00 Noon

**Abstract:** Determining how certain properties are related to other properties is fundamental to scientific discovery; further investigations into the geometry of the relationship and future predictions are warranted only if two properties are significantly related. To better discover any type of relationship underlying paired sample data, we introduce the multiscale graph correlation (MGC), which combines distance correlation, the locality principle, and smoothed maximum to yield a new and powerful dependency measure.

We prove that MGC is consistent for testing independence, enjoys a number of desirable theoretical properties, exhibits empirical power advantages against a wide range of nonlinear and high-dimensional dependencies, and can be efficiently implemented and utilized for real data exploration.

**Bio:** Cencheng Shen received his PhD degree in Applied Mathematics and Statistics from Johns Hopkins University in 2015. He worked as a visiting assistant professor in the Department of Statistical Science at Temple University from 2015 to 2016, re-joined Johns Hopkins University as an assistant research scientist in The Center for Imaging Science from 2016 to 2018, and is currently an assistant professor in the Department of Applied Economics and Statistics at University of Delaware. He is also affiliated with Department of Mathematical Sciences and Data Science Institute at UD. His research interest is focused on various aspects of multi-modal data, including testing independence,

correlation analysis, kernel transformation, dimension reduction, pattern recognition and supervised learning. His research has been funded by NSF DMS, DARPA SIMPLEX, and DARPA L2M.