

11th Annual Women in Mathematics Day

Jean E. Rubin Memorial Lecture

Thursday, September 28, 2017

3:30 p.m.

MATH 175

Refreshments will be served at 3:00 p.m. in the Library Lounge

Gene Expression Data Analysis Using the Gene Ontology

Abstract:

Current technologies for biological systems give scientists the ability to record thousands of measurements for each biomolecule, including genes, proteins and metabolites. Domain enhanced analysis (DEA) uses the Gene Ontology (GO) to guide analysis of such data with a goal of increased interpretability. DEA uses a “top-down” approach to perform domain aggregation by first combining gene expressions related to each GO term using the Partial Least Squares (PLS) procedure. The first scores from the PLS procedure applied to each GO term are used to test for differentially expressed patterns using a standard t test. We find the general t test inadequate for adjusting for the number of genes within each GO term. New tests are proposed by finding a more appropriate null distribution for each PLS score, a distribution that is adjusted for the size of the GO term. We also discuss the impact of using different two-class classification response variables, namely 0/1 or -1/1.

Speaker:

Jacqueline M. Hughes-Oliver

North Carolina State University
Professor of Statistics

Jacqueline M. Hughes-Oliver earned her PhD in Statistics from NC State in 1991, following a BA in Mathematics from the University of Cincinnati in 1986. After one year at the University of Wisconsin-Madison, Dr. Hughes-Oliver returned to NC State where she transitioned through the usual academic ranks.

From 2005 to 2009, Dr. Hughes-Oliver was Director of the Exploratory Center for Cheminformatics Research at NC State. Her methodological research focuses on prediction and classification, analysis of high-dimensional data, variable and model selection with dimension reduction, design and analysis of pooling or mixture experiments, optimal design, and spatial modeling.

Dr. Hughes-Oliver is a Fellow of the American Statistical Association and was awarded the 2014 Blackwell-Tapia Prize for contributions to the mathematical sciences.



Jean E. Rubin was Professor of Mathematics at Purdue University from 1967 until her death in 2002. She earned a B.S. from Queen's College in New York City in 1948, an M.A. from Columbia in 1949, and a Ph.D. from Stanford in 1955. She taught at the University of Oregon and Michigan State before coming to Purdue. Professor Rubin was the author of more than 40 papers and five books in set theory and questions related to the axiom of choice.