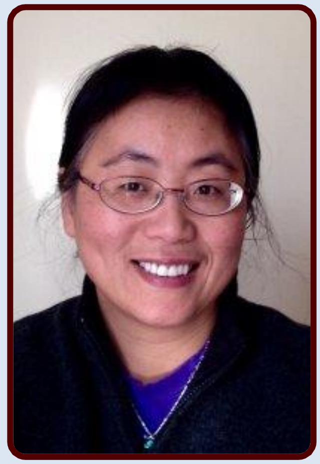
Department of Statistics, Texas A&M University

RONALD R. HOCKING ENDOWED LECTURES



PEIYONG ANNIE QU

Professor of Statistics, Director of the Illinois Statistics Office
University of Illinois at Urbana-Champaign

INDIVIDUALIZED MULTILAYER TENSOR LEARNING WITH AN APPLICATION IN IMAGING ANALYSIS

ABSTRACT:

This work is motivated by breast cancer imaging data, which is quite unique in that the signals of tumor-associated microvesicles (TMVs) are randomly distributed from each individual image. This imposes a significant challenge for conventional imaging regression and dimension reduction models assuming a homogeneous feature structure. We develop an innovative multilayer tensor learning method to predict disease status effectively through utilizing subject-wise imaging features and integrating multimodality information. Specifically, we construct a multilayer decomposition which leverages an individualized imaging layer in addition to a modality-specific tensor decomposition. One major advantage of our approach is that we are able to efficiently capture the individual-specific spatial information of microvesicles through combining multimodality imaging data as well as incorporating modality-wise features simultaneously. To achieve scalable computing, we develop a new bi-level block improvement algorithm. In theory, we investigate both the algorithm convergence property and asymptotic consistency for model estimation. We also apply the proposed method for simulated and human breast cancer imaging data. Numerical results demonstrate that the proposed method outperforms other existing competing methods.

Joint work with Xiwei Tang and Xuan Bi.

DATE:	Friday, October 5, 2018
TIME:	11:30 a.m. – 12:30 p.m.
PLACE:	Room 113, Blocker

Lunch will be provided for the faculty following the presentation in the Fisher Bowl.

Department of Statistics, Texas A&M University

RONALD R. HOCKING ENDOWED LECTURES

MERLISE CLYDE

Professor and Chair, Department of Statistical Science
Duke University

BAYESIAN ANALYSIS OF LINEAR MODELS

ABSTRACT:

Linear models have a long and rich history and continue to play an important role in statistical inference and decision making, providing the foundations for more complex hierarchical models. Building on this, Bayesian treatments of linear models offer a perhaps overwhelming smorgasbord of prior choices. Prior distributions such as Zellner's g-prior and related mixtures of g-priors greatly simplify the array of options and have been widely used for inference, model selection and model averaging, with many desirable theoretical and computational properties. These priors may be appealing to non-Bayesians as posterior distributions are functions of the usual OLS or maximum likelihood estimates and test statistics, with posterior probabilities or Bayes Factors providing evidence in favor or against a hypothesis. Recent results, however, suggest that using a common g to scale the variances of all coefficients within a model may inadvertently lead to a Lindley/Bartlett paradox with Bayes factors favoring the null hypothesis or simpler models in direct contradiction to likelihood ratio tests and desiderata proposed in Bayarri et al. Turning attention to models based on factorial designs, we present a new family of block g-priors and mixtures for multi-way arrays with desirable theoretical properties that encompass both mixed and random effect models and can be employed in over-parameterized linear models. In the special case of 2^k factorials we draw connections between these priors and popular shrinkage priors such as the horseshoe prior.

DATE: Monday, December 3, 2018
TIME: 11:30 a.m. – 12:30 p.m.
PLACE: Room 457, Blocker

Lunch will be provided for the faculty following the presentation in the Fisher Bowl.