



# McGill

Department of  
Epidemiology, Biostatistics  
and Occupational Health

## Biostatistics Seminars Fall 2023



### **Zhihua (Sophia) Su, PhD**

Associate Professor  
Department of Statistics  
University of Florida

## **Envelope-Based Partial Least Squares**

Wednesday, September 6, 2023

3:30 pm – 4:30 pm

Room 1140

Hybrid Seminar (Dr. Su will present virtually from Florida)

### **Zoom Link:**

<https://mcgill.zoom.us/j/88354140659>

**Abstract:** Partial least squares (PLS) is widely used in applied sciences as an alternative method to ordinary least squares (OLS) for estimating the regression coefficients. It is known that PLS often has a better prediction performance compared to OLS, and the PLS algorithms can be adapted directly to the  $n < p$  case. Despite its popularity, the theoretical properties of the PLS estimator are largely unknown. As a result, it is hard to determine when PLS is better than OLS, what are the limitations for PLS and how to improve PLS. Cook et al. (2013) built a connection between PLS with a dimension reduction method called the envelope model. They showed that at the population level, PLS and the envelope model have the same target parameter, but they use different algorithms for estimation. This connection allows PLS to be studied in a traditional likelihood framework and facilitates model developments. We will address three issues of PLS in this context: variable selection, categorical predictors and scale invariance.

Link to website: <https://people.clas.ufl.edu/zhihuasu/>

[www.mcgill.ca/epi-biostat-occh/news-events/seminars/biostatistics](http://www.mcgill.ca/epi-biostat-occh/news-events/seminars/biostatistics)