

# Dimension Reduction and Prediction in Large $p$ Regressions

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## **Abstract**

Dimension reduction for regression is a prominent issue today because technological advances now allow scientists to routinely formulate regressions in which the number of predictors is considerably larger than in the past. Many methods with various degrees of success have been proposed to deal with such regressions. Principal components are perhaps the most widely used across the applied sciences.

In this talk, we will give an overview of methods for dimension reduction in regression with the emphasize on a class of model-based sufficient dimension reduction methods that includes principal components. We will propose Prediction by Principal Fitted Components (PPFC), a novel methodology for prediction in regression where the number of predictors  $p$  can be large or larger than the number of observations  $n$ . PPFC yields accuracy in prediction better than current leading methods. It applies to continuous outcome variables regardless of their distribution.