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Borrowing Information from Genomics Data to Boost Proteomics Discoveries

To date, there is an unmet clinical need to identify molecular indicators (e.g., proteins) of various diseases, including cancer, heart failure, and chronic obstructive pulmonary disease, among others. In this talk, I will focus on the problem of measurement errors in protein quantitations, which may affect the identification of protein biomarkers in a discovery study. As protein levels are regulated in part by gene expression, related genomic data can be integrated to address this problem through the implementation of instrumental variables estimators. The proposed methodology exploits the plausible mechanisms from existing biological knowledge that relate genes, proteins, and diseases and takes advantage of this knowledge to increase the signal strength of sometimes weak, but biologically relevant –omics signatures.