

THE DEPARTMENT OF MATHEMATICAL SCIENCES PROUDLY PRESENTS

# COLLOQUIUM

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## Quantiles Regression for Responses Repeatedly Measured with Error

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### ABSTRACT

Some problems in biostatistics are characterized by the presence of a response variable that is either unobservable or difficult to measure. Muscular strength in animals and humans, usually quantified through the grip strength, is an example of such variables. As a consequence, multiple measurements of the grip strength, which contain considerable measurement error, are often taken on the same subject. The research problem consists in estimating the conditional quantiles of latent response variable given a set of subject-specific covariates. For instance, one research interest in grip strength studies is estimating the conditional quantiles of the latent grip strength and covariates such as age and gender, which can be used to construct conditional grip strength charts. Current works in the literature apply conventional quantile regression method using the mean of the repeated measurements as the response variable. However, we show that this approach suffers from model misspecification and often leads to biased estimates of the conditional quantiles of the latent grip strength. Therefore, we propose a new semi-parametric estimation approach, which account for measurement errors and allows the subject random effects to follow a flexible distribution. Through simulation studies we demonstrate that the proposed method leads to consistent and efficient estimates of the conditional quantiles of a latent response variable. The value of the proposed method is also assessed by analyzing a grip strength data set on laboratory mice.

Monzón Building, Room 201, 10:30 AM  
Refreshments will be served  
15 minutes before the colloquium, M203

