

R. Clifton Bailey Statistics Seminar Series

Power Analysis of Longitudinal Data with Time-Dependent Covariates Using Marginal Models: Application to Osteoarthritis Initiative Data

Niloofer Ramezani

**Department of Statistics
George Mason University**

**Johnson Center G19 – Gold Room
[4400 University Drive, Fairfax, VA 22030](https://www.gmu.edu/locations/4400-university-drive/)**

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Abstract: Planning advantageous research projects with both high power and minimum sample size is an important step in any study. The extensive use of longitudinal data in different fields and the importance of their power estimation, yet the limited resources

about their respective power estimation tools, made it worthwhile to study their power estimation techniques.

The presence of time-dependent covariates triggers the need to use more efficient models such as generalized method of moments than the existing models, which are based on generalized estimating equations. Two different power estimation and minimum sample size calculation techniques for longitudinal data in the presence of time-dependent covariate using generalized method of moments approaches are constructed in this study. Their performances are evaluated using a simulation study as well as a pre-existing data set consisting of osteoarthritis initiative data from a multi-center study on osteoarthritis of the knee containing follow-up information over a period of up to 9 years.