

# COLLOQUIUM

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## Generalized Fiducial Inference for Linear Mixed Models

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A405 Wells Hall

10:20 a.m. - 11:10 a.m.

Refreshments: 10:00 a.m.

### Abstract

Fiducial inference was introduced by R.A. Fisher in 1930 to overcome what he perceived as a deficiency in Bayesian methodology - when a prior distribution is assumed without prior information. There have been several attempts over the subsequent decades to both develop and discredit Fisher's proposal. More recently, a framework has been advanced that has its roots in fiducial inference called Generalized Fiducial Inference (GFI).

Under the GFI paradigm, inference is performed by considering the generalized fiducial distribution on the parameter space, which has flexibility similar to a posterior distribution in Bayesian methods. GFI can be thought of as a transfer of probability from the model space to the parameter space, and a generalized fiducial distribution is defined for the unknown parameters of the model. In this talk, I will discuss how the generalized fiducial framework can be applied to some linear mixed model settings. Similar to Bayesian methodology, GFI is a computationally-based mode of inference, and we develop sequential Monte Carlo algorithms to obtain samples from the generalized fiducial distribution of the unknown parameters. The focus will be on normal linear mixed models, but logistic regression with mixed effects will also be addressed. In the normal linear mixed model setting, the proposed method is found to be competitive or better than competing methods when evaluated based on frequentist criteria of empirical coverage and average length of confidence intervals.

This is based on joint work with Jan Hannig (University of North Carolina at Chapel Hill).

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