1154-VC-710   **Dan Han*** (`dan.han@louisville.edu`), 2720 Hounz Ln, Louisville, KY 40223, and **Rajib Paul**. *Analysis of Social Network Structure Using Bayesian Exponential Random Graph Model with Heavy Tail Priors.*

Bayesian Exponential Random Graph Models (BERGM) are popular in accounting uncertainties in social networks. Usually, Gaussian priors are used for model parameters in BERGM. We develop a set of heavy tail priors using scale mixtures of Gaussians and show that this prior outperformed the previously existing priors in terms of model fitting and predictions. The proposed method is highly flexible because users can control the shapes of the distributions by carefully selecting the smoothness parameters. This new prior can be implemented using population Markov Chain Monte Carlo algorithms and adaptive direction sampling techniques. Through a series of simulations studies, we calculated the acceptance rate of the model that is the probability of accepting the proposed change in the network based on the resulting posterior distribution. Higher acceptance rates indicate a better fit of the model to the data. Further, we applied our method on friendship network data collected from Goodreau's Faux Magnolia High School and demonstrated that our prior has higher acceptance rates than existing methods. (Received September 10, 2019)