Meridith L. Bartley

Department of Statistics

Penn State University

State College, PA 16801

[bartley@psu.edu](mailto:bartley@psu.edu)

Ephraim M. Hanks

Department of Statistics

Penn State University

State College, PA 16801

hanks@psu.edu

David P. Hughes

Department of Entomology

Penn State University

State College, PA 16801

dhughes@psu.edu

Stephen T. Buckland

Editor-in-Chief

*Journal of Agricultural, Biological and Environmental Statistics*

June 13, 2018

Dear Dr. Buckland,

I am pleased to submit an original research article entitled “A Bayesian Penalized Hidden Markov Model for Ant Interactions” by Meridith Bartley, Ephraim Hanks, and David Hughes for consideration for publication in *Journal of Agricultural, Biological and Environmental Statistics*.

In this manuscript, we propose a novel penalized hidden Markov model that penalizes rapid state switching through a Bayesian ridge-like prior on continuous-time Markov chain transition rates. We show that this smooths the rate of estimated behavioral state switching and results in better 1-step ahead prediction than the non-penalized HMM. We demonstrate the utility of this penalized approach to stochastic process modeling on ant trophallaxis (feeding interaction) data.

This manuscript has not been published and is not under consideration for publication elsewhere.

Thank you for your consideration!

Meridith L. Bartley, M.S.