NIMBioS

National Institute for Mathematical and Biological Synthesis

cordially invites you to an

Interdisciplinary Seminar

with

NIMBioS Postdoctoral Fellows Invited Distinguished Visitor

Dr. Jay Ver Hoef

on

"Modern spatial statistics: Basis functions, convolutions, and big data"

Tuesday, October 18, 2016
3:30-5 p.m.
Reception & refreshments at 3 p.m.

Hallam Auditorium, Room 206
1122 Volunteer Boulevard

Jay Ver Hoef is a statistician for the National Marine Mammal Lab of the National Oceanic and Atmospheric Association, U.S. Department of Commerce. Ver Hoef develops statistical methods and consults on a wide variety of topics related to marine mammals. Ver Hoef's main statistical interests are in spatial statistics and Bayesian statistics, especially applied to ecological and environmental data.

Abstract: Since inception, spatial statistics has been plagued by computational constraints. The central problem is inversion of the covariance matrix, which is an n-cubed problem, which is only compounded by the increased interest in Bayesian hierarchical models that use Markov chain Monte Carlo methods. I will describe a popular trend lately to reparameterize spatial models as linear mixed models where the random-effects design matrix is reduced rank and composed of basis functions. There are interesting connections to spline models and moving average approaches (convolutions) that integrate kernels over white noise. The spatial basis approach allows implementation of models for large data sets and for developing dependence structures for complex topologies. I recount how these approaches became popular from early developments by Barry and Ver Hoef (1996), Higdon (1998), and Wikle and Cressie (1999). I illustrate the new methods with two cases: developing spatial abundance models for count data and novel spatial models for data collected from stream networks.

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http://www.nimbios.org/videos/livestream.
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