VIRGINIA TECH DEPARTMENT OF STATISTICS MU SIGMA RHO COLLOQUIUM



FAST FUNCTIONAL COMPUTER MODEL EMULATION BUILDING ON THE CONTRIBUTIONS OF THE DEPARTMENT OF STATISTICS AT VIRGINIA TECH

DEREK BINGHAM

APRIL 13 3.30 PM (ET)

IN-PERSON SEMINAR

JOIN ONLINE: ZOOM MEETING https://virginiatech.zoom.us/j/86237780926?pwd=cjVDTHFkTUpnUnBQSGg4Q1RFVzMxQT09

MEETING ID: 862 3778 0926, PASSCODE: STATSROCKS

Abstract

Computer models are often used to explore physical systems. Increasingly, there are cases where the model is fast, the code is not readily accessible to scientists, but a large suite of model evaluations is available. In these cases, an "emulator" is used to stand in for the computer model. Gaussian Process (GP) models are commonly used for computer model emulation; however they cannot scale to truly large datasets. Dense functional output such as spatial or time-series data adds an additional layer of complexity that must be handled carefully for fast emulation. In this work we develop a highly scalable emulator for functional data motivated by Virginia Tech professor Dave Higdon (Higdon et al, 2008), but built upon the Local Approximate Gaussian Process model developed by Virginia Tech professor Bobby



Gramacy (Gramacy and Apley, 2015). We apply our emulator to an application in materials science at Los Alamos National Lab. This is joint work with Grant Hutchings (SFU) and Earl Lawrence (Los Alamos National Lab).

Bio: Dr. Bingham is a professor and chair in the Department of Statistics and Actuarial Science at Simon Fraser University. His current research focuses on developing statistical methods for combining physical observations with large-scale computer simulators, including Bayesian computer model calibration, emulation, uncertainty quantification, Gaussian process models, inference for deep learning, and design of experiments. Much of his work is motivated by real-world applications. His recent collaborations include working with scientists from Argonne National Lab, Los Alamos National Lab, and US Department of Energy.