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Title: Fall 2016 SFU/UBC Joint Statistical Seminar
Event Type: Lecture-Seminar-Series

Location:
Room 7000 in the Harbour Centre

Dates:
Saturday October 22nd, 2016

Topic:
The work of graduate students from both the SFU and the UBC statistics departments.

Objectives Achieved:
Students from both departments got to meet each other and they also gained some knowledge of cutting edge research in statistics.

Organizers:
Department of Statistics and Actuarial Science at Simon Fraser University.

Speakers:
Nate Sandholtz, Department of Statistics and Actuarial Science, SFU
Bayesian Factor Analysis with Spatio-Temporal Dependence
Rising sea levels pose potentially serious consequences for coastal populations around the world. This highlights the importance of understanding how sea levels vary over time and space. We examine a set of residuals after de-trending the seasonal and annual variation in a three decade time series of sea level measures at 33 locations along the Atlantic Coast of the United States. We fit a spatio-temporal confirmatory factor analysis (CFA) model in a Bayesian framework, which offers a more favorable structure to implement spatio-temporal dependence than a maximum likelihood setting. We model temporal dependence through the latent factors while modeling the spatial dependence in the factor loadings. This dependence scheme enables us to make smooth predictions at unobserved locations along the entire East Coast of the United States with corresponding estimates of uncertainty. We compare the spatio-temporal model to the independent CFA model using a set of five locations that we will exclude when fitting the model, and through a small simulation study.

Sonja Surjanovic, Department of Statistics, UBC,
Using Computer Model Uncertainty to Inform the Design of Physical Experiments: An Application in Glaciology,
Computer models are used as surrogates for physical experiments in many areas of science. They can allow the researchers to gain a better understanding of the processes of interest, in situations

where it would be overly costly or time-consuming to obtain sufficient physical data. In this project, we give an approach for using a computer model to obtain designs for a physical experiment. The designs are optimal for modelling the spatial distribution of the response across the region of interest. An additional consideration is the presence of several tuning parameters to the computer model, which represent physical aspects of the process but whose values are not precisely known. In obtaining the optimal designs, we account for this uncertainty in the parameters governing the system. The project is motivated by an application in glaciology, where computer models are often used to model the melt of snow and ice across a glacier surface. The methodology is applied to obtain optimal networks of stakes, which researchers use to obtain measurements of summer mass balance (the difference between the amount of snow/ice before and after the melt season).

Trevor Thomson, Department of Statistics and Actuarial Science, SFU,
A Family of Distributions in Stochastic Processes with Applications to Spot Fires,
For many regions throughout the world, wildland fires are regular year-round occurrences that can potentially devour communities. As a result, numerous wildland fire management teams are employed to try and control these fires before they pose a heavy risk to human life and property. A spot fire is a term used to describe a newly-ignited fire caused by airborne embers, that is separated from the main fire front. These spot fires are extremely dangerous, can spread rapidly, and prevents fire fronts from being manageable. In this talk, we will examine the methodology in modelling the occurrence of a spot fire, which includes simulating a fire growth model based on Huygens' Principle. The result is a family of distributions to be utilized in modelling the time of a successful spot fire.

Tim Swartz, Department of Statistics and Actuarial Science, SFU,
Swartz on Sports,
This talk surveys some problems that I have worked on in sports analytics. Although there is a technical aspect to the work, the presentation will be non-technical and can be understood by those in middle school. Some of the sports that I may touch upon include bowling, basketball, hockey, cricket, highland dance, golf, soccer and baseball. I think that two messages that I want to get across are these: (1) there are some interesting datasets in sports analytics and (2) there are some interesting problems in sports analytics.

Guangyu Zhu, Department of Statistics, SFU,
Sparse Envelop Model: Efficient Estimation and Response Variable Selection in Multivariate Linear Regression,
Response variable selection arises naturally in many applications, but has not been studied as thoroughly as predictor variable selection. In this talk, I will firstly introduce the envelope model which allows efficient estimation in multivariate linear regression. Then I will introduce the sparse envelope model we proposed to perform variable selection on the responses and preserve the efficiency gains offered by the envelope model. We established consistency and the oracle property and obtain the asymptotic distribution of the sparse envelope estimator.

Links:
http://www.sfu.ca/~psang/JointSeminar2016.html
