



The 36th Annual Meeting of Alberta Statisticians

Welcome to the 36th Annual Meeting of all Alberta Statisticians. This year, the meeting will be held at the University of Alberta campus on October 18, 2014. We are grateful for the funding support from the Canadian Statistical Sciences Institute (CANSSI), the Pacific Institute of Mathematical Sciences (PIMS), and the Department of Mathematical and Statistical Sciences, University of Alberta.

Time: 1:00-5:00PM, Saturday, October 18, 2014
Venue: CAB 528 (Central Academic Building, 5th floor, Room 528),
Department of Mathematical and Statistical Sciences, University of Alberta

Program:

12:30-1:30 Registration, CAB 528

13:30 to 14:15 Dr. Rob Deardon, Associate Professor of Biostatistics
Department of Production Animal Health, Faculty of Veterinary Medicine and
Department of Mathematics & Statistics, Faculty of Science, University of
Calgary
Title: *Bayesian Optimal Design of Disease Transmission Experiments (and
Other Issues in Disease Modeling)*

14:15 to 15:00 Dr. Gemai Chen
Professor, Department of Mathematics and Statistics, University of Calgary
Title: *Dependent Extremes*

15:00 to 15:30 Coffee break

15:30 to 16:15 Dr. Giseon Heo
Departments of Dentistry and Mathematical and Statistical Sciences, University
of Alberta

Title: Beyond Mode Hunting

16:15 to 17:00 Dr. Edit Gombay

Department of Mathematical and Statistical Sciences, University of Alberta

Title: Change Detection for Time Series Following Generalized Linear Models

17:30 to 19:30 **Dinner**

P & L Chinese Restaurant,
10425 100 Ave Northwest Edmonton, AB
780-413-8898

ABSTRACTS

Talk 1

Title: Bayesian Optimal Design of Disease Transmission Experiments (and Other Issues in Disease Modeling)

Speaker: Dr. Rob Deardon, Associate Professor, Biostatistics, Department of Production Animal Health, Faculty of Veterinary Medicine and Department of Mathematics & Statistics, Faculty of Science, University of Calgary

Abstract: Of interest here is the issue of experimental design for animal disease transmission experiments, where the underlying goal is to identify some characteristic of the underlying infectious disease dynamics (e.g. the transmission rate, a vaccine effect, or the infectious period). Mechanistic disease transmission models are often necessary to analyze such data. However, design for non-linear models such as these is complicated by the fact that the optimal design depends upon the parameters of the model. As such, a Bayesian framework using informative priors is a natural setting for such design problems. Generic results are hard to formulate for such systems with results being highly dependent upon the system being observed, the models to be fitted, the characteristic(s) of the system to be identified, and, of course, the parameters. This means that the application under study is key. Analytically tractable results are also rare in this field with resort to Monte Carlo methods being common. Therefore, fast simulation is also of great importance. Here we consider some issues related to designing such experiments and (time permitting) discuss other issues of current interest in infectious disease epidemiology.

Talk 2

Title: Dependent Extremes

Speaker: Dr. Gemai Chen, Professor, Department of Mathematics and Statistics, University of Calgary

Abstract: The literature on extreme values is rich when the extremes are independent or asymptotically independent. When the extremes are dependent, not much experience is available, especially for finite sample data analysis. This talk reports some results obtained in studying finite sample dependent extremes.

Talk 3

Title: Beyond Mode Hunting

Speaker: Giseon Heo, Associate Professor, Dept of Dentistry and Mathematical and Statistical Sciences, University of Alberta.

Abstract: The scale space has been studied in the context of blurring in computer vision, smooth curve estimation in statistics, and persistent feature detection in computational topology. We review the background of three approaches and discuss how persistent homology can be useful in high dimensions.

Talk 4

Title: Change Detection for Time Series Following Generalized Linear Models

Speaker: Edit Gombay, Professor, Dept of Mathematical and Statistical Sciences, University of Alberta.

Abstract: The models considered in this talk are of great practical importance as they are used in measuring health care performance, evaluating financial markets, analysing industrial processes, and in climate studies. We survey recent theoretical developments concerning logistic and other regression models that allow AR(p)-type dependence structure together with the presence of covariates. Conditions are set for the Maximum Partial Likelihood Estimator's existence and its convergence to the true value. We can prove that this convergence is at the optimal rate. The performance of the score vector of the partial likelihood function is analysed. We can use it for

change detection and in sequential monitoring. Its usefulness will be demonstrated on data from clinical studies.