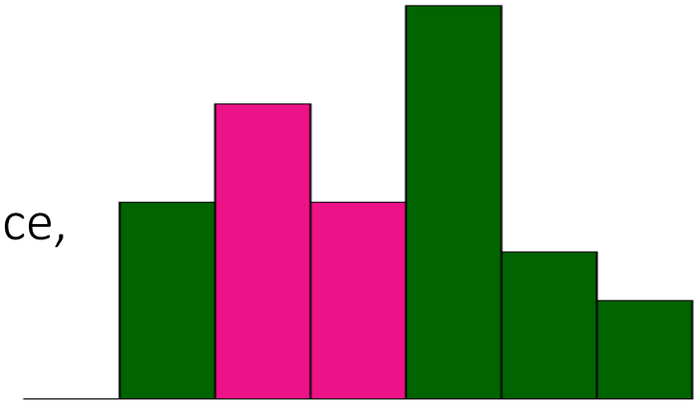
Welcome to

Statistics Mini-Workshop

on 7.4. 2016 from 10 to 13.30, lecture room M1, Aalto University School of Science, Department of Mathematics and Systems Analysis
No registration, just show up to listen to the following excellent speakers!



Teresa Ledwina (joint work with B. Ćmiel)
Title: Validation of positive expectation dependence

We shall present new tests for positive expectation dependence. The solutions are weighted Kolmogorov-Smirnov type statistics. They originate from the function valued monotonic dependence function, describing local changes of the strength of the dependence. Therefore, the inference can be supported by a simple and insightful graphical device. We shall show that an approach relying on multiplier central limit theorem and *p*-values allows to overcome inherent difficulties of this testing problem. Monte Carlo methods are used to assess the sizes and powers, and to compare new solutions to existing one. The simulations show that the new tests perform well infinite samples. Danish fire insurance data set shall be briefly examined to demonstrate the practical application of the proposed inference methods.

Gérard Biau (joint work with B. Cadre and K. Bleakley)
Title: Collaborative Inference
The statistical analysis of massive and complex data sets will require the development of algorithms that depend on distributed computing and collaborative inference. Inspired by this, we propose a collaborative framework that aims to estimate the unknown mean θ of a random variable *X*. In the model we present, a certain number of calculation units, distributed across a communication network represented by a graph, participate in the estimation of θ by sequentially receiving independent data from *X* while exchanging messages via a stochastic matrix *A* defined over the graph. We give precise conditions on the matrix *A* under which the statistical precision of the individual units is comparable to that of a (gold standard) virtual centralized estimate, even though each unit does not have access to all of the data. We show in particular the fundamental role played by both the non-trivial eigenvalues of *A* and the Ramanujan class of expander graphs, which provide remarkable performance for moderate algorithmic cost.

Niels Richard Hansen
Title: Degrees of freedom for discontinuous estimators
Most classical model selection criteria fail for discontinuous estimators such as the best subset selection estimator in linear regression. The uncertainty arising from the discontinuities is not accounted for, and the effective degrees of freedom of the estimator is underestimated. Consequently, the criteria provide underestimates of the risk. I will show some new results, which are extensions of Stein's unbiased risk estimate (SURE), which apply to discontinuous estimators. For one such estimator, the debiased lasso, we were able to derive an estimator of the effective degrees of freedom, which works well in practice.

Ingrid Van Keilegom
(joint work with Francesco Bravo and Juan Carlos Escanciano)
Title: Wilks' Phenomenon in Two-Step Semiparametric Empirical Likelihood Inference
In both parametric and certain nonparametric statistical models, the empirical likelihood ratio satisfies a nonparametric version of Wilks' theorem. For many semiparametric models, however, the commonly used two-step (plug-in) empirical likelihood ratio is not asymptotically distribution-free, that is, Wilks' phenomenon breaks down. In this paper we suggest a general approach to restore Wilks' phenomenon in two-step semiparametric empirical likelihood inferences. The main insight consists in using as the moment function in the estimating equation the influence function of the plug-in sample moment. The proposed method is general, leads to distribution-free inference and it is less sensitive to the first-step estimator than alternative bootstrap methods. Several examples and a simulation study illustrate the generality of the procedure and its good finite sample performance.

Laura Sangalli
Title: FDA and PDE modeling: a fruitful union
I will present a class of models for the analysis of functional data with complex structures/dependencies, such as spatially dependent curves and time dependent surfaces, observed over irregularly shaped domains and over manifold domains. The models are based on the idea of regression with partial differential regularizations. The methodology is illustrated in various applied contexts, including neuroimaging and other medical imaging data.