10:00-10:45 ARTHUR CHARPENTIER (ENSAE, Paris)
Title: Estimating (properly) copula densities in tails
Abstract: Estimating copula densities is an important issue when trying a get an accurate understanding of the dependence structure. The behavior in the neighbourhood of (0,0) or (1,1) describes more precisely the strength of the dependence between extremal events. Fitting properly the density in tails is then a key issue in risk management (e.g. in insurance, finance or hydrology). The first part of the talk will briefly recall some fallacies when dealing with pseudo-observations, since it should induce some lack of information when estimating copulas. The second part will focus on copula density estimation. Since one of the issue is to get a proper understanding of the tail behavior, parametric copulas may not be an appropriate tool (the shape of the density in the tail will depend on the underlying copula family). But on the other hand, standard nonparametric estimation of the density induce a strong biais in tails, especially when working with kernel estimates. Several tool will first be considered as the reflection method (Silverman (1986), Cline and Hart (1991)), the boundary kernel method (Müller (1991)) and the transformation method (Devroye and Györfi (1985), Wand, Marron and Ruppert (1991)). Then, a new estimator will be considered, using beta kernels (Brown and Chen (1999), Charpentier, Fermanian and Scaillet (2005)). As we shall see, those estimators have superior performance, compare with others. We will finally present an application on censored US insurance claim data (the Loss-ALAE dataset), and on simulated (censored) data.

10:45-11:30 DEBBIE DUPUIS (HEC Montréal)
Title: Using Copulas in Hydrology
Abstract: Multivariate modeling of extreme tails of correlated hydrological random variables will be discussed. We take a copula approach and model the dependence structure independently of the marginal distributions. We apply results from classical extreme value theory to choose marginal distributions for excesses of high thresholds and consider a broad collection of copula families to properly capture the dependence structure of these excesses. Copulas differ not so much in the degree of association that they provide, but rather in which part of the distribution this association is more pronounced. We discuss certain pertinent properties of copulas and give some insight to assist the practitioner in copula selection. We examine the effects of model mis-specification and the impact of the chosen method of estimation, targeting the estimated quantities frequently used by hydrologists. A simulation study shows not only the dangers of improper copula selection, but also the possible benefits of using a multivariate approach to estimate univariate quantities. We apply the methodology to the study of low-flow events and analyze two Canadian hydrometric data sets.

13:30-14:15 R. Laeven, M. Goovaerts and TOM HOEDEMAKERS (Katholieke Universiteit Leuven)
Title: Some Asymptotic Results for Sums of Dependent Random Variables with Actuarial Applications
Abstract: This paper establishes some asymptotic results for sums of dependent random variables, in the presence of heavy-tailedness conditions. We demonstrate how the derived

results can be used to approximate functionals of sums of dependent random variables for which the analytical expression is too cumbersome to work with and which are of major importance in actuarial applications. Numerical illustrations are provided to assess the quality of the asymptotic approximations.

14:15-15:00 Shaun Wang, Roger B. Nelsen and EMILIANO A. VALDEZ (University of New South Wales, Sydney)
Title: Distortion of Multivariate Distributions: Adjustment for Uncertainty in Aggregating Risks
Abstract: In practice, financial risk modelers often deal with portfolios of correlated risks, and they need to perform risk aggregation and attribution for such risk portfolios. Multivariate distributions (theoretical models, copulas, or simulated samples) are often employed to describe the correlation structure among the risks. In this paper, we apply probability distortion to multivariate distributions as a means of adjustment for risk and uncertainty in aggregating a portfolio of correlated risks; this is a direct extension of the more well-known probability distortion method in the univariate case. One interesting result of this operation is an observed resulting modification of the correlation structures. We also discuss the intimate links between the distortion functions and the various classes of copulas. Apart from providing theoretical background and motivation to the concepts, we give numerous examples and resulting properties, and illustrate their practical implications.

15:15-16:00 BRUNO REMILLARD (HEC Montréal)
Title: Bootstrapping methods for empirical processes
Abstract: In this talk I will show that some bootstrapping methods work for empirical processes, while some other methods do not work. Examples will include parametric bootstrap for goodness-of-fit test for copula families and multiplier methods for empirical processes of pseudo-observations.

16:00-16:30 MARTIN BILODEAU (University of Montreal)
Title: Statistical Estimation of Tail Conditional Expectations for Elliptical Distributions
Abstract: Artzner et al. (1999) introduced tail conditional expectations (TCE) for actuarial applications as a measure of right-tail risk or expected worse losses. For a portfolio of correlated risks, Panjer (2002) examined the allocation of the k-th risk to the aggregated risks in the case where the risks are jointly multivariate normal. Landsman and Valdez (2003) developed similar expressions as those of Panjer (2002) for the richer class of elliptical distributions which contains the normal distribution. My discussion will point out some limitations and difficulties associated with elliptical distributions for modelling TCE. I will also discuss the statistical estimation of TCE expressions which is not a trivial problem. The use of parametric bootstrap in this context will be illustrated with a numerical example.