



## Statistics and Actuarial Science Seminar

**Title:** Mixtures with a prior on the number of components and the telescoping sampler

**Speaker:** Gertraud Malsiner-Walli (WU Vienna University of Economics and Business)

**Date:** Mon 28th March 2022 at 12:00PM

**Location:** Online

**Abstract:** Within a Bayesian framework, a comprehensive investigation of the model class of mixtures of finite mixtures (MFMs) where a prior on the number of components is specified is performed. This model class has applications in model-based clustering as well as for semi-parametric density approximation, but requires suitable prior specifications and inference methods to exploit its full potential. We contribute to the Bayesian analysis of MFMs by (1) considering static and dynamic MFMs where the Dirichlet parameter of the component weights either is fixed or depends on the number of components, (2) proposing a flexible prior distribution class for the number of components  $K$ , (3) characterizing the implicit prior on the number of clusters as well as partitions by deriving computationally feasible formulas, (4) linking MFMs to Bayesian non-parametric mixtures, and (5) finally proposing a novel sampling scheme for MFMs called the telescoping sampler which allows Bayesian inference for mixtures with arbitrary component distributions. The telescoping sampler explicitly samples the number of components, but otherwise requires only the usual MCMC steps for estimating a finite mixture model. The ease of its application using different component distributions is demonstrated on real data sets.

This work is in collaboration with Sylvia Fruhwirth-Schnatter and Bettina Grün.

Reference: <https://projecteuclid.org/journals/bayesian-analysis/volume-16/issue-4/Generalized-Mixtures-of-Finite-Mixtures-and-Telescoping-Sampling/10.1214/21-BA1294.full>

Join: <https://ucd-ie.zoom.us/j/68316324831>