Contribution ID: **22** Type: **Speaker**

Fréchet means and Procrustes analysis in Wasserstein space

Tuesday, 15 August 2017 15:30 (30 minutes)

We consider three interlinked problems in stochastic geometry: (1) constructing optimal multicouplings of random vectors; (2) determining the Fréchet mean of probability measures in Wasserstein space; and (3) registering collections of randomly deformed spatial point processes. We demonstrate how these problems are canonically interpreted through the prism of the theory of optimal transportation of measure on $\mathbb{R}^d$. We provide explicit solutions in the one dimensional case, consistently solve the registration problem and establish convergence rates and a (tangent space) central limit theorem for Cox processes. When $d > 1$, the solutions are no longer explicit and we propose a steepest descent algorithm for deducing the Fréchet mean in problem (2). Supplemented by uniform convergence results for the optimal maps, this furnishes a solution to the multicoupling problem (1). The latter is then utilised, as in the case $d = 1$, in order to construct consistent estimators for the registration problem (3). While the consistency results parallel their one-dimensional counterparts, their derivation requires more sophisticated techniques from convex analysis. This is joint work with Victor M. Panaretos

Primary author: Dr ZEMEL, Yoav (Ecole polytechnique fédérale de Lausanne)

Co-author: Prof. PANARETOS, Victor (Ecole polytechnique fédérale de Lausanne)

Presenter: Dr ZEMEL, Yoav (Ecole polytechnique fédérale de Lausanne)