**Speaker: Jairo Cugliari (Université Lumière Lyon 2)**

**Date: 01/04/2025 at 13:15 in 1 WN 3.11**

**Title: Improved linear regression prediction by transfer learning**

**Abstract:**
Transfer learning aims to reuse knowledge from a source dataset to a similar target dataset. While many studies address the problem of what or how to transfer, the all-important question of when to do so remains largely unanswered, especially from a theoretical point of view for regression problems. In this talk, I will present the general framework of transfer learning. Then, I will detail a new theoretical framework for the problem of parameter transfer for the linear model. It is shown that the quality of transfer for a new input vector depends on its representation in an eigenbasis involving the problem parameters. In addition, a statistical test is constructed to predict whether a fine-tuned model has a lower quadratic prediction risk than the basic target model for an unobserved sample. The effectiveness of the test is illustrated on synthetic as well as real electricity consumption data. Moreover, the transfer strategy can be generalized to a larger class of models, albeit using non-closed forms of the predictors. Then, Bregman divergences arise naturally to measure the quality of the transfer and allowing the extension of the results to the case of generalized linear models.