International Workshop on Nonlocal Models, PDEs and Applications

13 - 14 May 2019 Caen, Normandy, FRANCE

Keynote n°10 : **Yves Van GENNIP**
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Title: **Deep limits of residual neural networks**

In their study of the continuum limits of variational problems on graphs, Dejan Slepcev and Nicolas Garcia Trillos introduced an elegant method to identify discrete graph-based functions with continuum functions through an optimal transport construction. Since its introduction this method has proven applicable to many graph-to-continuum limiting problems.

In this talk we will see a new setting in which this method has been successfully applied: the deep layer limit of neural networks. In particular, we will show that the training of a residual neural network can be formulated as a constrained discrete variational problem, whose deep layer limit (i.e. #layers --> infinity) is given by a continuum variational problem constrained by an ordinary differential equation.

This is joint work with Matthew Thorpe