

The Working Group on Risk - CREAR, with the support of the IDS dpt,  
Institut des Actuaire, LabEx MME-DII, and the group BFA (SFdS),  
has the pleasure to invite you to the seminar by:

**Prof. Fabrice ROSSI**

Université Paris-Dauphine  
CEREMADE MILES

## “Generative Models for Dynamic Graph Exploration”

*at ESSEC La Défense (CNIT) – Room 202, 12:30-1:30pm*

Graphs provide interesting models for representing interactions between entities. While a large part of the literature is dedicated to the simple situation where interactions are static and binary, many real world situations ask for more complex models which account for the temporal dimension of the interactions as well as for their other characteristics. In this joint work with M. Corneli, P. Latouche and C. Bouveyron, we propose extensions of the stochastic block model to interaction data with a temporal component and with a textual one. A classical way of representing temporal interactions consist in constructing a time series of graphs, where each graph aggregates the interactions over a given time interval. While this approach can produce interesting results, it cannot adapt to more complex schemes where a single time scale cannot capture the full temporal dynamic of the interactions. In our approach, we use a continuous time model which enables us to limit temporal aggregation to very short time intervals, mostly motivated by computational consideration. We propose in addition a variant of our model that can model text messages attached to interactions via a dynamic topic model. I will present in this talk an introduction to generative models for graphs with a gradual introduction of elements needed to handle continuous time and information attached to interactions. The models will be illustrated on two real world examples: a validation study using the bike sharing system of London and a more complex analysis of the Enron email database.

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For any information:  
Melissa Bagri – 0134433797 - bagri@essec.edu  
<http://crear.essec.edu/working-group-on-risk>





# Prof. Fabrice ROSSI

Université Paris-Dauphine

Member of CEREMADE and MILES

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Fabrice Rossi is full Professor of Data Science at University Paris Dauphine, PSL. He is a member of the CEREMADE and of the MILES team. He specializes on exploratory data analysis with a special interest in graph data, change detection and visual data exploration. More generally, his research covers numerous important themes of machine learning including large scale data processing, feature selection, learning theory and clustering. Fabrice Rossi works frequently with researchers from other fields, especially from the humanities, including archaeology, history and sociology. He has (co)-authored more than 160 articles in journals and conference proceedings.



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