In order to capture these latent multivariate correlations one need to develop novel methodologies for co-evolving network datasets, multivariate statistical models, and information extraction algorithms. One challenge is to understand how complex network structures and ongoing dynamical phenomena influence the evolution with ongoing dynamical processes.

The DANTE team is an Inria team located in Lyon hosted by the ENS Lyon and the IXXI Complex System Institute. The goal of DANTE is to study and model the dynamics of large-scale complex networks, e.g. social networks, technological networks, social-communication networks, etc. Building on the advancements of the digital data revolution, our main challenge is to propose generic methodologies and concepts to develop relevant formal tools to model, and analyse the dynamics of dynamical networks and ongoing dynamical phenomena. Our main focus areas are:

- Find solutions in the applications domain related to communication networks. In particular, we study the dynamic of the network (available bandwidth, traffic, etc.) and propose solutions to adapt its parameterisation accordingly.

Online social platforms provide information about the interaction structure of users forming globally connected networks, where information is exchanged commonly in textual form. While users can be associated to their individual socio-demographic status (SES), linguistic features, or topical interest, they may form well connected communities around commonly interesting subjects. This coupling between text, network, and sociolinguistic communities appears to be a fundamental character of online social networks. However, current approaches usually consider only one side of these correlations, while fail to identify multivariate dependencies between the network, SES, and language. In order to capture these latent multivariate correlations one need to develop novel methodologies which is capable to consider together all the information available on the complex network topology.
the socio-economic, and the textual data. To reach this integration, we aim to take advantage of the recently developed methodological framework of deep neural networks.

The objectives of this postdoc is to explore this context via the development of semi-supervised multi-factorial analysis methods based on deep learning using heterogeneous data. The aim is to infer correlations / patterns that exist between dynamic linguistic variables, mesoscopic structure and social network dynamics and their socio-demographic and socio-economic attributes. We will base our studies on a corpus of 200 Million tweets from 2 Million users that has been collected over a period of 2 years within the DANTE team. In addition to this corpus itself, we combine this textual data with network informations inferred from tweets and user profiles, and socioeconomic informations obtained from census data.

**Principales activités**

The successful applicant will work on the following topics:

- Collection, statistical analysis, and mining of large digital datasets recording the blog posting activity and interactions of millions of users on Twitter.
- To development of statistical learning methods to understand the co-evolution of the network structure, language dynamics, and individual variables like SES, location, or demographic variables.
- To carry innovative methods for the representation of results.

**Compétences**

Applicants should have a PhD degree in computer science, physics, or related discipline with strong interest in complex networks, social phenomena, and computational linguistic.

Background in complex networks, data analysis, computational modelling is an advantage.

Efficiency in programming, data analysis and analysis are required.

Good academic writing and presentation skills in English are required.

There are no teaching obligations but opportunities.

**Avantages sociaux**

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

**Rémunération**

Gross salary: 2650 Euros per month