



European Research Council
Established by the European Commission



1 year Post-doc position at IFSTTAR, COSYS, LICIT – 2016/001

L. Leclercq, 6/09/2016

Title: Sensitivity analysis about the impacts of user choices on transportation network performance – Butterfly effect

This Post-doc position is funded by an ERC Consolidator Grant hold by Prof. L. Leclercq (project MAGnUM - <http://magnum.ifsttar.fr>). This will provide a stimulating working environment with lots of international collaborations. The MAGnUM team will be composed with 3 permanent researchers, 4 PhD students, 3 post-docs and 2 research engineers all working on close and connected topics.

Resume:

This post-doc position aims to investigate how global traffic dynamics in transportation networks is influenced by individual traveling behaviors and local conditions. Individual traveling behaviors are often represented by choice models that describe route, mode choices and departure times for all users or groups of users. The dimensionality of the problem is then huge as parameters are defined at the scale of alternatives and users. The definition of set of possible alternatives (routes and modes) is also a key element to characterize the system response and should be considered in the scope of the sensitivity analysis.

Here, the ambition is to use innovative methods from the field of sensitivity analysis to reduce the problem dimension, to screen parameters and to classify those that are the most influential for the global network performance at large scale. A particular focus attention will be paid to dependencies among entry parameters. Clustering technics may also be of use.

Sensitivity analysis will use extensive simulations through the Symuvia platform. This platform is a dynamic and microscopic traffic simulation tool that has been developed at the LICIT laboratory. A very large set of scenarios for different kinds of networks will be simulated considering high range of variations for the demand and the individual behaviors. Meta-model approaches may be considered to reduce computational times.

Sensitivity analysis will permit to tackle several crucial questions, like the following:

- Impacts of individual route choices for highly meshed networks with lots of alternatives. Clustering methods can help to reduce the issue of size by defining homogeneous sets of route choices with regards to their global impact on the network;
- Impacts of trip ending behaviors and the impact of the time to park;
- Impacts of the global multimodal demand profile including mode and departure time choices.

Skills:

We are looking for highly talented and motivated PhD graduates in Statistics, data mining or computational sciences. Good English skills (speaking and writing) is required, as are strong analytical skills and project management skills. As the projects are part of a large research

program, we seek for opportunities for the project members to cooperate on various topics. Affinity for working in a group is therefore preferred. Some basic knowledge about transportation systems and traffic models is appreciated.

Other information:

Hosting Laboratory: LICIT (IFSTTAR / ENTPE), licit.ifsttar.fr, www.ifsttar.fr, www.entpe.fr

Supervision: Prof. Ludovic Leclercq

Location: Lyon, France

Starting date: 01/12/2016 or 01/01/2017

Gross salary: 2190 € / month

Duration: 12 months

Applications:

Applicants should send their CV, a motivation letter and a copy of their PhD manuscript by e-mail to ludovic.leclercq@ifsttar.fr. Recommendation letters may be requested during the selection process. They will get an answer only if their application is considered for a first interview.