**Proposition de recherche doctorale**

**Communicating, storing and computing on the edge: fog wireless networks under complexity constraints**

**Mots clés :**
- Directeur de thèse : petros ELIA
- Co-encadrant(s) :
- Unité de recherche : Laboratoire de recherche d'EURECOM
- Ecole doctorale : École Doctorale Informatique, Télécommunications, Électronique de Paris
- Domaine scientifique principal: Divers

**Résumé du projet de recherche (Langue 1)**

(Thématique L : électronique, communication) The expected increase of the users and the demanded high-rate information is going to strain cellular network infrastructure. To this end, the establishment of localized communication links can be exploited, by introducing small cell concepts (e.g. femtocells or WiFi off-loading) or direct device-to-device (D2D) transmissions, and avoiding the participation of the base station in communication. Currently, a large portion of data traffic in mobile networks is related to predictable content, requested by multiple users (e.g. video files). For such cases, caching mechanisms at user terminals and/or small-cell access points are proposed as a way to increase throughput and ease the burden carried by base stations. These mechanisms utilize information such as the popularity distribution of requested content, graph-theoretic modeling of content availability and network topology (connectivity between users demanding content and caching points). Based on these mechanisms, algorithms must be devised in order to minimize the strain of BS by establishing as many caching point-to-user links as possible and improve the provided QoS (e.g. minimize the average download time) by deciding which content should be available at the caching points. Both objectives however are characterized by problem formulations, belonging in the NP class, with inherent high worst-case complexity.

**Informations complémentaires (Langue 1)**

Dr. Elia’s group is in cooperation on the topics of the proposed thesis, with the group of Syed Jafar at the University of California Irvine, with the group of Joakim Jaldén at KTH Stockholm, and with the group of Andrea Goldsmith at Stanford.

**Informations complémentaires (Langue 2)**