MSc Thesis (30 cr.) at Ericsson Research, Lindholmen – Analysis of integrated access and backhaul (IAB) in future 5G systems (263560)

Job Summary
The fifth generation of wireless networks (5G) must provide high-rate data streams for everyone, everywhere at any time. To meet such demands, it is required to use large bandwidths. Here, it is mainly concentrated on millimeter wave-based (potentially, massive multiple-input and multiple-output (MMIMO)) links as a key enabler to obtain sufficiently large bandwidths/data rates. Importantly, the presence of very wide bandwidths makes it possible to include the wireless backhaul transport in the same spectrum as the wireless access. For this reason, 3GPP has considered such integrated access and backhaul (IAB) network configurations where a (potentially, fiber-connected) access point (AP) provides other APs as well as the customer-premises equipment (CPEs) inside its cell area with wireless backhaul and access connections, respectively.

From the theoretical perspective, IAB networks are different from the conventional relay networks, because the information load changes in different hops. Particularly, as the number of hops/CPEs per hop increases, the APs need to transfer an aggregated data of multiple CPEs accumulated from the previous hops. As a result, the AP-AP backhaul links are heavily loaded which may lead to high decoding complexity/delay and buffering cost for the APs and large end-to-end transmission delay/low end-to-end throughput for the CPEs. These are the motivations for the proposed project.

The aim of the project is to perform theoretical analysis of IAB networks. Particularly, the project aims to address the following challenges:

1- Deriving theoretical results on the ultimate achievable rates of IAB networks,
2- Evaluating the effect of various parameters, such as blockage, AP-AP distances, number of hops/CPEs per hop, on the system performance,
3- Developing efficient resource allocation schemes to reduce the load of the AP-AP backhaul links,
4- Proposing and analyzing effective techniques to reduce the buffer requirement and/or decoding delay/complexity of IAB networks.

Key Qualifications
- Strong analytical skills and ability to acquire new knowledge and apply it in the job
- Good knowledge of communications and information theory
- Good communication skills in written and spoken English
- Ability to formulate problems and solve them independently
- Creativity and ability to work independently
- Ability to develop and drive new ways of working, to produce research results in a more efficient way
- Deciding & Initiating Action
- Working with People
- Presenting & Communicating
- Applying Expertise & Technology

Additional Details
The work is expected to start in January 2019. The work is proposed for one student for a duration of 6 months. Location is at Ericsson in Göteborg, Sweden.

Applications should include a short motivation letter, CV, and transcripts of records. Please submit your application in English as soon as possible - we are working continuously with candidate selection. For informal queries, feel free to email Mikael Coldrey, Research Manager, Ericsson Research, mikael.coldrey@ericsson.com. Apply online at Ericsson: https://career2.successfactors.eu/sfcareer/jobreqcareer?jobId=263560&company=ericsson&username.

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