Thesis Title: Cloud-Native 5G Radio Access Network

Applications are invited for a PhD position at EURECOM, Sophia-Antipolis, France in collaboration with Davidson Consulting (https://www.davidson.fr/).

**Position:** planned for 36 months  
**Issue Date:** 12th of Feb 2020  
**Start date:** When the position is filled  
**Location:** Eurecom, Campus SophiaTech, in the French Riviera.  
**Doctoral School:** Sorbone University

**Description:** Softwareization and virtualization of mobile networks are changing the economics of telco world to help network providers to move from proprietary and bespoke hardware and software platforms towards an open, cost-effective, and flexible cellular ecosystem [1]. Cloud native computing uses an open source software stack to deploy applications as microservices, packaging each part into its own container, and dynamically orchestrating those containers to optimize resource utilization. Cloud native approach is a novel approach of designing lightweight, isolated context, and deployable at scale applications that fully exploit the features of cloud. Due to its distinct features (compared to IT applications), supporting telco applications (e.g., 4G/5G) in the cloud has many challenges, such as microservice modelling and meshing of RAN functions, geographical distribution of the network functions in view of stringent constraints among network functions, coexistence of physical and virtual functions, while maintaining service continuity and user experience. In addition, network slicing can be efficiently supported following cloud-native computing principles to allow network service customization as per need of slice owners.

This thesis is going to address both theoretical and experimental system research toward the future cloud-native 5G RAN along the following areas:

- State of the art literature study of cloud native approach and its challenges in telco domain,
- A novel modelling approach to cloud-native network service with stringent constraints to allow a higher flexibility in management and orchestration and improve performances.
• Scalability, agility, and automation of RAN service in view of spatio-temporal traffic variability, geographically distributed network, and different network deployment model.
• Native support of network slicing with cloud-native principles.
• Experimentally validate a subset of proposed solutions using OpenAirInterface and Mosaic5G platforms [2][3].

**Context:** The research work will be carried out in close collaboration with Davidson Consulting and their partners as well as a community of researchers and developers already working on OpenAirInterface and Mosaic-5G platforms.

**Requirements:**
We are looking for candidates who are self-motivated and would like to conduct high quality research, and publish in top venues. Candidates should have a Master's Degree (or an equivalent degree) in Electrical Engineering, Computer Science or a closely related area, preferably with a focus on networking or communications. We also expect candidates to have very good experimental (IT) and background knowledge in the area of wireless networking, and the understanding of the current technology landscape (5G and 4G) as well as the key enabling technologies such as SDN/MEC/NFV. Good C/Python/Matlab programming skills and experiences are also required. A good level of written and spoken English is mandatory (knowledge of French is not required). Finally, the selected candidate will be well-organized to integrate and work in groups.

**Applications**
Application evaluation will start immediately and will continue until position is filled. Interested individuals should submit:

1. 1-2 pages of research interests and motivation corresponding to thesis description.
2. Detailed CV including publication list.
3. At least two recommendation letters.
4. Transcripts of courses taken at graduate and undergraduate levels with grades.

Applications should be sent to osama.arouk@eurecom.fr and navid.nikaein@eurecom.fr mentioning the following reference: 5G_CN_RAN PhD Position.
**About**

**EURECOM:** EURECOM is an elite French graduate school and research center conducting high quality research in the areas of Communication Systems, Data Science, and Digital Security. Eurecom\(^1\) is located in new Campus SophiaTech\(^2\) in Sophia Antipolis (between Nice and Cannes), Europe's leading international science park, in close proximity with a large number of research units of leading multi-national corporations in the telecommunications, semiconductor and biotechnology sectors, as well as other outstanding research and teaching institutions. A freethinking, multinational population and the unique geographic location provide a quality of life without equal.

**Davidson:** Created in 2005, Davidson is a consulting company specialized in management and technology with a presence in eight countries spread across Europe, the United Arab Emirates and North America. Within the Davidson Consulting Group, Davison R&D coordinates the R&D activities through a well-established partnership with world-class research laboratories, proposing technical and managerial guidance for R&D strategies, proposing guidance regarding technical anticipations to industrial clients.

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\(^1\) [https://goo.gl/maps/jUQJXTVHF4C2](https://goo.gl/maps/jUQJXTVHF4C2)

\(^2\) [https://goo.gl/maps/3WoFstVD4vS2](https://goo.gl/maps/3WoFstVD4vS2)