



## Post-doc Offer

### Advanced Reconfigurable Antennas for 5G heterogeneous networks at millimeter waves

- **Key words**

5G, reconfigurable antennas, 60-GHz band

- **Context and overview of the problem**

To meet growing demand for higher throughputs in future 5<sup>th</sup> generation (5G) wireless systems, advanced digital communications techniques based on multicarrier modulations, multiple antenna systems (MIMO) and their extension to massive MIMO (M-MIMO), powerful coding schemes or interference coordination could be combined with solutions based on densification networks and deployment of heterogeneous infrastructures. An alternative but complementary way to increase throughputs is to deploy cellular systems operating in millimeterwave (mmW) bands, e.g. in V-band (57-66 GHz), and in E-band (71-76 GHz, 81-86 GHz). In such a context, M-MIMO systems, with dozens of radiating elements at the access point, are extremely attractive solutions to achieve very high data rates (multi-gigabit / sec) for multiple users sharing the same spectrum at the same time, with low power consumption thanks to the use of specific analogue/digital precoding techniques. Moreover, any effective hardware implementation of such systems must rely on a realistic knowledge of channel impairments and mmW propagation / antenna characteristics, especially for outdoor and mobile communications for which the data available in the most recent literature are very limited. The proposed Post-doc will be carried out in the frame of a collaborative research project (*M5HESTIA*) funded by Excellence Lab. *CominLabs* (<http://www.cominlabs.ueb.eu/fr/welcome-to-cominlabs>). The general objective of *M5HESTIA project* is to design advanced M-MIMO antennas and characterize / model the outdoor mmW channel in order to demonstrate, a full M-MIMO hardware (HW) platform operating in the 60-GHz band. The main partners of *M5HESTIA* are **IETR** ([www.ietr.fr](http://www.ietr.fr)), **LabSTICC** (<http://www.lab-sticc.fr/>), **Orange Labs** ([www.orange.com/fr/Innovation](http://www.orange.com/fr/Innovation)), and **IRT b<com** ([www.b-com.com/](http://www.b-com.com/)).

- **Description of work**

The aim of this Post-doc project is to design advanced antenna architectures for future 5G networks in V-band. The work is organized into different steps:

- The study of different mmW front-end architectures adapted for MASSIVE MIMO application
- The design of the mmW front-end including amplifier, mixer, oscillator
- Measurement and validation
- Participation to the co-integration with the radiating element
- Participation to the final demonstrators
- Participate to the development of the LTCC technology available in Telecom Bretagne

- **Localisation**

Telecom Bretagne, Brest, France , microwave department <http://www.telecom-bretagne.eu/>

- **Date** : from 01/01/2017 to 31/12/2018

- **Candidate profile**

The Post-doc candidate should hold a Phd degree. He should have an experience in electromagnetic theory, microwave theory, mmW application, active circuits. **Due to the specific funding, the candidate has to be a foreign student or have spent at least 12 months abroad in the last 3 years.**

- **How to apply?**

For more information, motivated candidate can contact François GALLEE ([francois.gallee@telecom-bretagne.eu](mailto:francois.gallee@telecom-bretagne.eu)) and should send by email 1) a detailed CV, 2) a motivation letter, 3) a recommendation letter and 4) marks obtained over the last 3 years.