



## ----- JOB ANNOUNCEMENT -----

### POSITION TITLE

**Post-doctoral fellow in Vulnerability assessment of PON-type (Passive Optical Network) access networks against potential DAS-based (Distributed Acoustic Sensing) eavesdropping**

## TELECOM PARIS

Télécom Paris, a school of the IMT (Institut Mines-Télécom) and a founding member of the Institut Polytechnique de Paris, is one of the top 5 French general engineering schools.

The mainspring of Télécom Paris is to train, imagine and undertake to design digital models, technologies and solutions for a society and economy that respect people and their environment. The school is committed to providing an environment conducive to the development of all students and research professors, and is voluntarily and sustainably committed to an ambitious plan for social and ecological transition. It is working to increase the number of female research professors and to reduce the disparities between men and women.

An inclusive campus on a "human scale" but with a strong international component, Télécom Paris is recognized for its proximity to companies. This public school guarantees excellent employability in all sectors and is the leading engineering school for the entire digital vertical (from hardware layers to uses). With its excellent teaching and innovative pedagogy, Télécom Paris is at the heart of a unique innovation ecosystem, based on interaction and the importance of project mode in its training on the one hand, and its interdisciplinary research on the other. Its teacher-researchers are affiliated with two research laboratories: on the one hand, the LTCl laboratory, which is presented by the HCERES as a flagship unit in the field of digital sciences with remarkable international influence; and on the other hand, the i3 laboratory, Institut interdisciplinaire de l'Innovation (I3 - UMR 9217 of the CNRS), which pursues a multidisciplinary research program focused on innovation in the framework of a collaboration with the École Polytechnique and Mines ParisTech.

Télécom Paris is positioned as an open-air laboratory for all the major technological and societal challenges: artificial intelligence, quantum computing, IOT, cybersecurity, large-scale digital equipment (Cloud), 5G/6G, Green IT.

Based in Palaiseau, at the heart of the Institut Polytechnique campus alongside the École Polytechnique, ENSTA, Télécom Sud Paris and ENSAE, Télécom Paris also has an incubator based in Paris at the heart of the French start-up ecosystem.

## SCIENTIFIC CONTEXT

This study is conducted within the framework of Project « EAT » RAPID (Régime d'Appui Pour l'Innovation Duale), resulting from a partnership between the company Febus Optics and Telecom Paris.

The innovative nature of this work lies in defining the network conditions allowing for a cybersecurity audit on already deployed infrastructures.

Distributed Acoustic Sensing (DAS) via optical fiber is a recent technology with a constantly diversifying range of applications. These include perimeter intrusion detection, seismic measurements, and borehole diagnostics (oil & gas, geothermal), among others. The measurement bandwidth, ranging from sub-Hertz to hundreds of kilohertz, also enables the capture of audio signals, thereby allowing for acoustic measurements over optical fibers. It is thus possible to exploit a building's telecom optical

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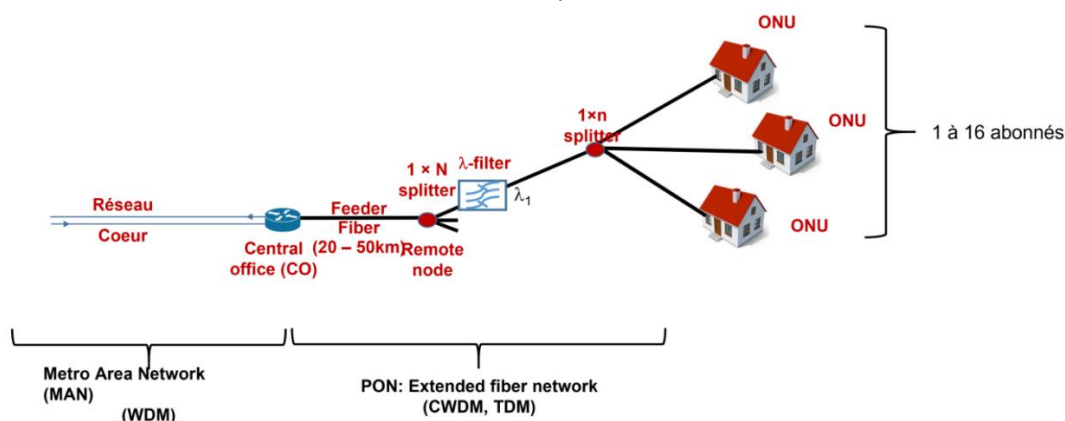
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network for eavesdropping by using a modified DAS system. This involves integrating specific hardware artifacts (fiber coils, antennas, connectors) near the listening zone and employing dedicated signal processing to achieve sufficient performance.

#### Postdoctoral Objectives

The scope of this postdoctoral research is to evaluate the vulnerability of telecom networks to potential DAS-based eavesdropping. Connecting to an active local optical telecom network requires adapting to its specific architecture, particularly regarding the wavelength plan.

The audit of telecommunication systems to assess their vulnerability is a major challenge for telecom networks. An example of an access network configuration is described in the figure below. From the Backbone network and starting from the Central Office (CO), telecom signals are routed to subscribers via a Passive Optical Network (PON). Inside buildings, an FTTX (Fiber To The Home, Room, Office, etc.) or an optical Local Area Network (LAN) is used to deliver the optical signal to the final terminal or to enable communication between local terminals via optical links.



The PON consists of a feeder fiber followed by at least one  $1 \times N$  splitter. Information encoding relies on a combination of Coarse Wavelength Division Multiplexing (CWDM) and Time Division Multiplexing (TDM). Each output port of the  $1 \times N$  splitter is sent to groups of 1 to  $n$  subscribers through at least one filter that selects their allocated wavelength. After this filter, the signal becomes monochromatic and TDM-encoded. A final  $1 \times n$  splitter distributes the signal among the  $n$  subscribers. Consequently, this PON includes passive splitters, connectors, splices, and other components.

#### Goals and Work Packages :

The objective of this postdoctoral fellowship is to conduct an assessment of the different types of deployed networks and evaluate their impact on DAS measurement capabilities:

- Description of various existing local area network types.
- Assessment of different transmission schemes: CWDM, TDM, etc.
- Identification of the various access points for DAS measurements.



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- Discrimination of different fibers interrogated after a splitter and the influence of reflective points.
- Study of power margins required for DAS measurements.
- Analysis of potential add-drop nodes and the limits of optical transparency.
- Sensitivity analysis of DAS measurements based on fiber types and their environment.
- Impact of the final reflector on eavesdropping capabilities.

The innovative nature of this work lies in defining the network conditions, DAS configurations, and performance metrics required to conduct a cyber audit on already deployed infrastructures.

Beyond a synthesis of field-deployed configurations, the project will involve conducting tests either on an authorized live network or on a model network implemented specifically for this study. This work will lead to the identification and specification of the required interfacing modules, followed by their design and fabrication.

## JOB DESCRIPTION

### MAIN RESPONSIBILITIES AND DUTIES

**Post-doctoral fellow in : Vulnerability assessment of PON-type (Passive Optical Network) access networks against potential DAS-based (Distributed Acoustic Sensing) eavesdropping**

### POSITION RESPONSIBILITIES

#### 1. To carry out research in the field of optical fiber sensor

- Conducts research assignments under departmental contracts in the field of optical fiber transmission and optical fiber sensing
- Participates in and ensures the completion of project deliverables

#### 2. To ensure supervision and tutoring missions

- Supervises student projects and engineering internships

#### 3. To contribute to the reputation of the School, the Institut Mines-Télécom and the Institut Polytechnique de Paris

- Publishes the results of her/his research work



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- Gives presentations and conferences
- Is involved in learned or professional societies
- Maintains close relations with academic institutions, research centers and companies

#### 4. Other activities

- Participates in the scientific, pedagogical and management activities of the Department or Institution
- If necessary, directs and manages the agents placed under his/her responsibility or supervision
- Reports on the activities and results of the missions for which he/she is responsible

### SKILLS

#### Required skills, experience, and knowledge:

- Knowledge in fiber-optic transmission systems, networks and fiber sensing
- Background in communication and networking systems, signal processing, physics
- Fluency in English

#### Other abilities and skills:

- **Ability to work in a team, dialogue and writing skills**
- **Interpersonal and pedagogical skills**
- **Programming in Linux computing clusters**

### REQUIRED QUALIFICATIONS

#### Candidates with the following qualifications may apply:

- PhD or equivalent

## ADDITIONAL INFORMATION

Date posted: 25/06/2026

Type of contract: **Post-doctoral fellow**

Duration of the contract: **12 months**



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Location: Télécom Paris, 19 Place Marguerite Perey, Palaiseau 91120, France

Department/Unit: COMELEC Department

Superior/Supervisor: Head of Department: Xavier BEGAUD

Category / job title: II – P

Category / titles agents can apply for: II

### APPLICATION INSTRUCTIONS

Applications should be submitted using the following link: [URL RECRUIT](#) and include:

- A detailed CV
- A cover letter
- Any element considered useful for the examination of the application

**In order to be considered, applications must be received no later than: 11/30/2026.**

Scientific contact person: Renaud GABET (renaud.gabet@telecom-paris.fr)

Administrative contact person: Hamidou YAYA KONE (hamidou.kone@telecom-paris.fr)

*Our recruitment is based on skills, without distinction of origin, age, gender identity, or sexual orientation, and all our positions are open to individuals with disabilities.*