

Henri FAYOL Institut

Call for Applications End-to-End Encryption in 5G Networks (27-Month Postdoc Position)

Mines Saint-Etienne is part of the Institut Mines-Télécom (IMT), France's leading public engineering and management school group. IMT is an EPSCP (grand établissement) under the authority of the French Ministry of the Economy, Finance and Industrial and Digital Sovereignty.

The École Nationale Supérieure des Mines de Saint-Étienne (Mines Saint-Etienne) is responsible for training, research and innovation, transfer to industry and scientific, technical and industrial culture.

Mines Saint-Etienne represents : 2,400 student engineers and researchers in training, 450 staff (150 researchers and teacher-researchers), a consolidated budget of 46 M€, 3 campuses dedicated to i/ industry in Saint-Etienne and Lyon (AURA region) ii/ microelectronics and connected objects in Gardanne (Aix-Marseille Provence metropolis, SUD region) and iii/ health engineering in Saint-Etienne; 6 research units; 5 training and research centers; "La Rotonde", France's leading center for scientific, technical and industrial culture (> 50,000 visitors / year).

The Times Higher Education ranks us 300-400th worldwide in "Engineering & Technology" (1st higher education and research establishment in the two regions to which we belong) and 1st French establishment for Sustainable Development Goals (SDGs) 11 - Sustainable Cities and Communities and 13 - Combating Climate Change. Our working environment is characterized by a high ratio of teaching staff to students, high ratios of support staff to researchers and high ratios of PhD students to researchers, as well as top-level experimental and numerical modeling/simulation resources. A member of the T.I.M.E. association, which brings together the best Universities of Technology, Mines Saint-Etienne is also a member of the European University EULIST, through its membership of the Institut Mines-Télécom.

Mines Saint-Etienne's strategy for the next 5 years is focused on supporting companies and organizations in the changes brought about by ecological, digital and generational transitions, and on supporting national and European sovereignty in microelectronics; through training, research, technology transfer and science education.

5G promises "seamless" networks where a set of parameters can be negotiated prior to establishing communications (slices). As for the cybersecurity of communications, the solution generally adopted is an "onion peeling" approach. This solution results in delays and additional costs that could potentially be reduced. We propose to study and evaluate end-to-end encryption mechanisms that would be cost-effective and efficient while ensuring cybersecurity in networks involving multiple actors.

This work is funded within the framework of the HiSec project of the *PEPR 5G and Future Networks*, with the Institute Mines-Télécom as the awardee.

In this context, we are looking for a young PhD holder with expertise in cybersecurity or 5G networks. In-depth knowledge of encryption mechanisms and key exchange is a plus for the application.

Job Description:

Mines de St-Etienne also participates in the AMI-CMA Security (TCE) and 5G (IMTFor5G+) projects. As part of these projects, we are establishing a complete private 5G infrastructure and plan to deploy use

cases in the context of the industry of the future. Our main objective is to assess the security needs and minimum performance levels.

As a postdoctoral researcher in cybersecurity/5G, you will have the opportunity to collaborate with various expert teams at IMT involved in these projects.

Your activities within the project will include:

- Studying the currently deployed security and privacy solutions in 5G networks, with a particular focus on evaluating their performance in terms of latency, throughput, and energy consumption.
- Proposing and evaluating alternative solutions that are more efficient in all aspects (latency, throughput, energy, etc.).
- Developing, testing, and evaluating the selected proposals within use cases related to the industry of the future.

The position is located in St-Etienne.

Required Profile :

- Ph.D. or engineering degree in computer science and cybersecurity.
- Experience in designing and implementing security measures for communication networks.
- Ability to work in a multidisciplinary team.
- Knowledge of communication protocols and technologies used in 5G networks and/or future industry technologies would be a plus.

Recruitment conditions :

- These missions will be carried out on the Saint-Etienne Campus (42).
- The duration of the contract is a **27-month fixed-term contract**.
- Desired start date: **as soon as possible**
- Remuneration will be set according to the candidate's profile, in line with the rules defined by the Institut Mines Télécom's management framework.

How to apply :

Applications must include :

- A letter of application,
- A curriculum vitae outlining research and development activities, skills and knowledge in the above fields (10 pages maximum),
- At the applicant's discretion, letters of recommendation,
- A copy of the last diploma obtained (engineering diploma, doctorate).
- Copy of an identity document

Applications must be submitted on the RECRUITEE platform, following this link :

<https://institutminestelecom.recruitee.com/o/postdoctorant-ou-postdoctorante-chiffrement-de-bout-en-bout-dans-les-reseaux-5g-cdd-de-27-mois-postdoc-position-endoend-encryption-in-5g-networks-fixed-term-contract-27month>

Candidates selected for an interview will be notified as soon as possible.

As part of its Equality, Diversity and Inclusion policy, École des Mines de Saint Etienne is an employer committed to fair treatment of all applicants.

Positions offered for recruitment are open to all, with accommodations available on request for candidates with disabilities.

For further information

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