



Henri FAYOL Institut

Call for Applications Definition and evaluation of use cases for networks of the future and 5G in the context of Industry 4.0 (24-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.

The deployment of 5G in Industry is taking place in a context where multiple communication technologies (old and new) are or will be available to interconnect IoT or IIoT devices. These technologies (e.g. 5G, SIGFOX, Lora, WIFI) are involved in different types of plant (manufacturing, chemical processes), with different uses (e.g. production automation, robot fleet control, intelligent asset management, connected worker), each to meet particular requirements with advantages/disadvantages.

As part of this project, we propose to compare and possibly combine several of these heterogeneous communication technologies, to assess their advantages and disadvantages in relation to various

constraints (reliability, security, energy footprint, ...) in various contexts of IIoT and IoT applications of Industry 4.0.

To this end, we propose to carry out this work at two manufacturing industry experimentation sites, DIWII and IT'M Factory (offering IIoT, cobotics, digital twin and supply chain environments) at Mines Saint-Etienne. Each of these sites is equipped with different communication technologies.

In this Industry 4.0 environment, the aim will be to define illustrative use cases with communication profiles integrating the main requirements of the manufacturing field (latency, reliability, security, massive connected devices, etc.) and the characteristics of the communication technologies, in different configurations. With the help of industrial engineering experts, these use cases will be enriched with a set of key performance indicators. Various experiments will be carried out to validate communication technologies against the defined indicators, in order to identify limitations and key areas for improvement, and to support the development of reliable, reasoned use of these technologies in an Industry 4.0 context.

This work is financed as part of the FITNESS project of the PEPR 5G and Networks of the Future, of which Institut Mines-Télécom is the laureate.

In this context, we are looking for a PhD student with skills in networks and 5G. Knowledge of various IoT, IIoT terminals is a plus for the application.

Job description :

Mines de St-Etienne is also participating in the AMI-CMA 5G (IMTFor5G+) and the METAVERS 5G project. Within this framework, we are setting up a complete private 5G infrastructure on our Industry of the Future platforms (IT'M and DIWII). These platforms will be the deployment sites for Industry of the Future use cases.

As a post-doc in networks and 5G in this project, you will have the opportunity to collaborate with the various teams of Institut Mines Telecom experts involved in these different projects, as well as with the Industrie 4.0 experts at Mines Saint-Etienne.

Your activities within the project will include :

- Defining Industry 4.0 use cases and networks of the future
- Proposing and evaluating alternative solutions with improved performance in all respects (latency, throughput, energy, etc.);
- Development, testing and evaluation of selected proposals for use cases related to the industry of the future.

The position is based in Saint-Etienne.

Required Profile :

- PhD or engineering degree in computer science and networks
- Experience in designing and implementing communication networks.
- Ability to work in a multi-disciplinary team.

Recruitment conditions :

- These missions will be carried out on the Saint-Etienne Campus (42).
- The duration of the contract is a **24-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 by following this link:

<https://institutminestelecom.recruitee.com/o/postdoctorant-ou-postdoctorante-definition-et-evaluation-de-cas-dusages-de-reseaux-du-futur-et-5g-dans-le-contexte-de-lindustrie-40-cdd-de-24-mois-postdoc-definition-and-evaluation-of-use-cases-for-networks-of-the-future-and-5g-24-months>

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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