

R&D internship in IoT/WSN in Inria 2024-2025

Inria is the French national research institute for digital science and technology. In 220 project teams, most of which are shared with major research universities, more than 3,900 researchers and engineers explore new paths, often in an interdisciplinary manner and in collaboration with industrial partners to meet ambitious challenges.

FUN (Future Ubiquitous Networks) project team is based in Inria center at Université de Lille in Villeneuve d'Ascq. FUN members imagine self-organization solutions for future wireless sensor, actuator and RFID networks to allow those kinds of networks to self-deploy, to every entity to discover, to communicate, to know when to sleep, when to transmit, etc. Solutions are validated through experiments.

FUN project team is recruiting a research and development intern in IoT/WSN. The candidate should be preparing for a Master 2 or an engineering degree (5th year) in the field of computer science.

Subject: Refactoring and Modularizing NS-3 Code for Enhanced Clarity, Reusability, and New Functionalities in Network Simulations

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Internship conditions:

- **Duration:** 4-6 months
- **Location:** 40 Avenue Halley, 59650, Villeneuve d'Ascq, France
- **Project team:** FUN

Keywords: IoT, wireless sensor networks, edge-enhanced devices, network simulation, code modularization and reusability

Context:

NS-3 is a widely-used simulation tool for modeling network protocols and systems. However, due to its complexity, many simulation scripts and codebases lack modularity and are difficult to read, extend, or reuse across projects. Refactoring the NS-3 simulation code will create a cleaner, more structured, and modular framework, allowing users to build upon it with ease and implement new network scenarios more efficiently.

Objectives:

The goal of this internship is to refactor and modularize an existing NS-3 (Network Simulator 3) simulation codebase to improve its readability, maintainability, and scalability, while implementing new network simulation functionalities. Through this project, the intern will gain hands-on experience in network simulation, code modularity, and best practices in C++ programming for NS-3. The code in hand simulates an adhoc network composed of wireless sensor nodes and edge-enhanced devices. Such networks can be deployed in a disaster area for post-disaster management and monitoring purposes.

Profile:

Preparing for a Master 2, an engineering degree (4th or 5th year) or equivalent in the field of computer science, the candidate should:

- Have good programming skills in C/C++ and Python and a strong base in design principles.
- Show a strong interest in experimentation and have a practical sense, especially in the field of IoT.
- Prior knowledge of NS-3 modules, simulation setup, and network modeling is a plus.
- Have a good level of English (reading/writing).
- Have good organizational, relational, listening, and receptive skills.

Please send your CV+motivation letter at carol.habib@inria.fr

References:

<https://www.nsnam.org/>

Militano, L., Arteaga, A., Toffetti, G. and Mitton, N., 2023. The Cloud-to-Edge-to-IoT Continuum as an Enabler for Search and Rescue Operations. Future Internet, 15(2), p.55.