



Grenoble INP - UGA is a member of **international** engineering and management education and research **networks**. It is widely recognized in national and international rankings.



**8** schools + **39** laboratories

**8300** students

**1 300** teaching, research, administrative and technical staff

Grenoble INP - UGA is a renowned public institution of higher education and research, and a major player in the Grenoble ecosystem. It is the engineering and management institute of Grenoble Alpes University, and plays a leading role in the scientific and industrial community.

## Researcher in industrial engineering

<b>Job reference number</b>	
<b>Research field</b>	Industrial Engineering
<b>Host laboratory</b>	G-SCOP Lab (UMR 5272 Grenoble-INP, UGA and CNRS) / Website: <a href="https://g-scop.grenoble-inp.fr">https://g-scop.grenoble-inp.fr</a>
<b>Researcher profile</b>	First stage researcher - doctorate (R1)
<b>Location</b>	Grenoble, France
<b>Date of recruitment / contract length</b>	01/10/202 (36 months)
<b>Contacts</b>	Fabien MANGIONE: <a href="mailto:fabien.mangione@grenoble-inp.fr">fabien.mangione@grenoble-inp.fr</a> Van-Dat CUNG: <a href="mailto:van-dat.cung@grenoble-inp.fr">van-dat.cung@grenoble-inp.fr</a>

Grenoble INP - UGA is a leading public institution accredited with the French label "Initiative d'excellence". It offers innovative engineering and management programs, with an increasing internationalization of its course offers. The courses are grounded in sound scientific knowledge and linked to digital, industrial, organizational, environmental and energy transitions. The Engineering and Management Institute of Grenoble Alpes brings together more than 1300 staff members (teacher-researchers, lecturers, administrative and technical staff) and 8300 students, located on 8 sites (Grenoble INP - Ense3, Grenoble INP - Ensimag, Grenoble INP - Esisar, Grenoble INP - Génie industriel GI, Grenoble INP - Pagora, Grenoble INP - Phelma, Polytech Grenoble, Grenoble IAE and the INP Prepa). Grenoble INP is also a highly-ranked institution of higher education and research, leading the way in the fields of engineering and management on an international scale. It is a member of a large number of international academic and research networks. It is part of the European University UNITE!.

As part of Grenoble Alpes University, Grenoble INP has associated guardianship of 39 national and international research laboratories and of technological platforms. The research conducted there benefits both its socio-economic partners and its students. Grenoble INP is at the heart of the following scientific fields: physics, energy, mechanics and materials; digital; micronanoelectronics, embedded systems; industry of the future, production systems, environment; management and business sciences.

Grenoble INP - UGA is an equal opportunity employer committed to sustainability. Grenoble INP-UGA celebrates diversity and equity and is committed to creating an inclusive environment for all employees. All qualified applications will be considered without discrimination of any kind.

## Research

G-SCOP is a multidisciplinary research laboratory addressing the challenges of designing, optimizing, and managing products and production systems. The research conducted covers the entire lifecycle of a product or product/service, from its creation to its end-of-life, including design, production, distribution, usage, and then recycling, reuse, or disposal phases. The production system can address both manufacturing industries and health systems, energy management and usage systems, and more.

In this field, the major scientific challenges in the coming years are divided into two main areas:

- Achieving the digital transition of production and product/service design systems.
- Developing a human- and society-centered production and product/service design system.

G-SCOP tackles these challenges through research conducted in Flow Management and Integrated Product Design, supported by cross-disciplinary expertise in Industrial Information Systems and Optimization Methods, both in their applied and fundamental forms.

The recruited individual will be integrated into the GROG team, whose work focuses on decision support to optimize the performance of production systems, whether in the design or operational phase. These production systems for goods and services can be a single machine on a production line, a complete workshop, a logistics platform, or a supply chain consisting of multiple companies. For this purpose, operational research tools and techniques are used. The work addresses both theoretical models and industrial applications.

### **PhD thesis offer description:**

The increasing market share of electric vehicles will lead to a growing demand for batteries [5,13]. These batteries are primarily composed of "cells," which themselves made of materials (Lithium, Cobalt, Graphite, etc.) considered strategic by the European Commission. These materials are costly to extract and are subject to multiple risk factors (geopolitical, environmental, social, etc.) [3]. These risks are further amplified by the reaching of planetary limits [12].

One of the industry's challenges is to establish a supply chain that is resilient and aims to reduce environmental impact [9]. The concept of circularity, derived from the circular economy, aims to address these goals [1,6,7]. Applied to a supply chain [2,4], its primary principle is to reuse products at the end of their life cycle (production waste, end-of-

life products, or those no longer in use) by moving as little backward in the chain as possible. This is referred to as "reuse" if the product is reused as is, "remanufacturing" if assemblies are reused, and so forth [11].

The second principle is to use a product that no longer meets its original specifications for a different purpose, known as "repurposing" [8,10]. From a supply chain perspective, this involves sending products, with or without transformation activities, to other supply chains.

This PhD thesis aims to characterize the activities necessary to increase the circularity of a supply chain. To achieve this goal, it is necessary to formalize and simulate various potential scenarios for such circular supply chains. In the first phase, for each scenario, it will be required to implement means to measure circular performance at different decision levels (Strategic, Tactical, and Operational). The next phase will involve comparing this performance regarding sustainable issues (economic, environmental, and social) to propose a method for scenario selection. Finally, a deployment methodology can be proposed as support for operational activities.

#### Expected Outcomes

- A state-of-the-art review of circularity indicators, circular supply chains and production systems for electric vehicle batteries.
- Definition of scenarios for developing circular activities.
- Modeling and quantification through simulation and/or testing of circular activity deployment scenarios.
- Implementation of a methodology and digital decision support tools to support the deployment of scenarios.

## Specific requirements or conditions

The candidate should hold a Master's degree or equivalent and have prior research experience in industrial engineering (internship in a laboratory, research thesis, etc.). Skills in modeling, simulation, optimization, and life cycle analysis will be necessary

Proficiency in English is required.

#### Specifics of the position

The research will be lead on Grenoble location.

#### Position assigned to a restricted area: NO

(Device for the protection of the scientific and technical potential of the nation, conditioning the appointment of the researcher to the authorization of the Defense Security Officer).

## How to apply

Applications must be sent to: [fabien.mangione@grenoble-inp.fr](mailto:fabien.mangione@grenoble-inp.fr)

Application deadline : 30/06/2024