



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.

## PhD in integrated design methods for sustainable solutions (for Makers and Do it Yourself)

Job reference	2024-PHDCONCEPTSOLUDURAB-GSCOP
Research field	Eco-design, Ergonomics, Co-design, Makers' Community, Sustainable development, Sustainable solutions, Low-tech
Host laboratory	G-SCOP (UMR 5272 Grenoble-INP, UGA and CNRS) / Website : <a href="https://g-scop.grenoble-inp.fr/fr/laboratoire">https://g-scop.grenoble-inp.fr/fr/laboratoire</a>
Requested profile	First stage researcher - doctorate (R1)
Location	Grenoble, France
Date of recruitment / contract term	01/10/2024 (36 months)
Contacts	<a href="mailto:Helmi.benrejeb@grenoble-inp.fr">Helmi.benrejeb@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

**Team: Systemic Design: Human, Environment, Technology (CoSys)**

**Laboratory website:** <https://g-scop.grenoble-inp.fr/fr/laboratoire>

G-SCOP is a multi-disciplinary laboratory designed to meet the scientific challenges posed by current and future changes in the industrial world. The laboratory's scope ranges from product design to the management of production systems, drawing on strong skills in optimization. G-SCOP is a benchmark laboratory in France in the field of production systems (the only CNRS UMR focused on production systems; entrusted by the ANR to steer thinking on the production systems of the future...) but also internationally, via its research networks (CIRP, Design society...) and its research projects linked to industry 5.0 and industrial renewal on a European scale.

The G-SCOP laboratory's design teams are recognized for their expertise in collaborative design and product lifecycle engineering. Their aim is not only to design and develop solutions, but also to propose design and organization methods that enable us to understand and support the evolution of industry and emerging technologies, leading to new forms of consumption and production.

The COSYS team will host the PhD student in collaboration with the PACTE laboratory. The team places the user and the environment at the heart of its research. Its work integrates the themes of the circular economy; the design of sustainable, personalized, useful and usable products and services; eco-design; and user-centered design. The team aims to mobilize technologies and design organizations to serve people and the environment.

Among the scientific challenges addressed by the team are :

- *The place of human beings in relation to technology in their professional and social environment*
- *Innovation for people and the environment*
- *Design management under constraints of scarce materials and environmental impact*
- *Eco-design and human factor methods, and supporting tools*
- *Understanding the levers for defining a sustainable circular economy*

## **Offer description:**

*"The "maker" world is part of a long-term history that, since the industrial revolution, has seen a succession of different waves of discourse and practices, all of which have in common the valorization of DIY and do it yourself" (Berrebi-Hoffmann, Bureaun, and Lallement 2018).*

Makers often operate outside conventional industrial production frameworks, combining creativity and technology to meet local needs, while valuing collaboration, knowledge sharing, open-source/open-hardware and low-tech (Browder, Aldrich, and Bradley 2019; Dreessen, Schepers, and Leen 2016; Abbassi et al. 2022). However, to maximize their impact on sustainability, it is crucial that these initiatives systematically integrate certain principles, such as those of eco-design or ergonomics from the earliest stages of co-design (Rio and Tyl 2022; Unterfrauner et al. 2019; Caroly and Barcellini 2013).

This thesis is part of the ANR Makers project, in which the G-SCOP and PACTE laboratories are partners. The aim of the Makers project is to understand the extent to which a paradigm shift in the management of technological innovation, driven by the Makers movement, enables us to move away from a traditional entrepreneurial model, by taking into account territorial issues, technological reappropriation, user needs (bottom-up approach) and the circular economy. To this end, our project focuses on three interacting lines of research:

- Focus 1: Identify makers' initiatives that address sustainability issues and contribute to a regional dynamic,
- Axis 2: Understand the individual and collective activities of makers in designing innovative and sustainable products/services with territorial impact,
- Axis 3: support the development of makers' activities to underpin the integrated design process, leading to sustainable solutions in economic, social and environmental terms.

The PhD student will work mainly on axis 3. He/she will support design projects and the integration of various design principles, which will be translated into a guide co-constructed with the makers. He/she will participate in the analysis of project data in relation to the work of Axis 1 and 2 partners.

This thesis is positioned at the intersection of eco-design, ergonomics and the collaborative design/manufacturing practices of makers. It aims to develop, propose and test a methodology for effectively integrating sustainability principles into product design by the maker community. This methodology will be based on an in-depth review of integrated design methods (Design for X - DfX) already developed (Dufrene, Zwolinski, and Brissaud 2013) but adapted to the flexible and innovative dynamics specific to makers.

#### **Objectives :**

- Develop an integrated Design method for Makers and Do it Yourself, to promote the creation of truly sustainable solutions.
- Experiment with this method through pilot projects with the Makers community, assessing its applicability, effectiveness and impact on the sustainability of the solutions developed.
- Identify challenges, opportunities and best practices to encourage the adoption of these sustainability principles within makers' communities, with a view to amplifying their contribution to the Sustainable Development Goals (SDGs).

#### **Methodology :**

The research will be based on a qualitative, participatory approach, combining case studies, co-design workshops and interviews with makers, ergonomists and eco-design experts. Particular attention will be paid to documenting and analyzing co-design processes, in order to identify key success factors and obstacles encountered. Beforehand, a literature review on eco-design, co-engineering and the community of makers in sustainable territorial dynamics will be necessary.

#### **Deliverables :**

1. a skills repository co-constructed with the Makers in connection with the compliance of sustainable solutions.
2. a guide, co-created with the Makers, to project management that takes into account the principles of eco-design, ergonomics, safety, etc. in the search for sustainable solutions.
3. knowledge of how to manage makers' innovation projects with a territorial and sustainable vision

## Specific requirements or conditions

Candidate with an engineering degree or equivalent in Mechanical Engineering, Industrial Engineering or generalist, with a strong interest in sustainable development, open innovation, and collaboration with maker communities. Previous experience of working with makers or on eco-design projects would be an asset.

#### **Special features of the position**

Research can be carried out at several sites in Grenoble and St Martin-d'Hères. In view of existing partnerships, long-term international travel is expected.

#### **Position in a restricted area: NO**

## How to apply

Send a complete file containing : CV, cover letter, summary of Master's research work, transcripts, any other document that may support motivation for the thesis, to :

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**Application deadline: June 12th (2024/06/12)**