


IMT Mines Alès
École Mines-Télécom


SCIENCE & CREATIVITY TO INVENT A SUSTAINABLE WORLD

Post-doctoral position

Bio-based materials and biodiversity for innovative constructed wetlands for wastewater treatment and reuse

Establishement :	IMT Mines Alès (National School of Mines of Alès)
Main assignement :	Centre for Research and Education in Environment and Risks (CREER)
Administrative residence:	Alès (Gard Department – Occitanie Region)
Type of contract :	24-month fixed-term contract - Public law contract - Full-time
Start date :	**June 1, 2026**

Presentation of our establishment, the CREER Centre

The Institut Mines-Télécom

The Institut Mines-Télécom (IMT), a large institution within the meaning of the Education Code, is a public scientific, cultural and professional establishment (EPSCP) under the main supervision of the ministers in charge of industry and digital technology. The leading group of engineering schools in France, it brings together 11 public engineering schools spread across the country, which train 13,500 engineers and PhDs. IMT employs 4500 people and has an annual budget of €400 million, 40% of which comes from its own resources. IMT has 2 Carnot institutes, 35 industrial chairs, produces 2100 A-rank publications annually, 60 patents and carries out €110 million in contract research.

IMT Mines Alès

Purpose of the school: "With its membership of IMT and its territorial presence, IMT Mines Alès gives its students the best chances to achieve professional fulfilment in order to be responsible actors in the development of the Nation by preserving the wealth of the Planet." The values that drive us: boldness! Commitment, sharing, excellence.

Created more than 180 years ago, IMT Mines Alès currently has 1400 students (including 250 foreigners) and 380 staff. It has two campuses in Alès and is also located in Montpellier and Pau. Its students are general engineers, specialized engineers (by apprenticeship), doctoral students and students of master's or specialized master's degrees. It welcomes more than 500 trainees in continuing vocational training.

The school has 3 research and teaching centers of high scientific and technological level, which work in the fields of materials and civil engineering (C2MA), environment and risks (CREER), artificial intelligence and industrial and digital engineering (CERIS). These entities bring together around 85 permanent teacher-researchers, 40 research support staff, 100 doctoral students and post-doctoral fellows, who produce each year more than 130 A-rank publications and €3 million in research contracts, a third of which are direct contracts with companies. These research staff contribute to 6 research units, including 4 UMRs (joint research units). IMT Mines Alès is accredited to award the doctorate degree in 4 doctoral schools.




It has 12 technology platforms and 1600 partner companies. Creativity is a strong characteristic that permeates all its activities. The school was the first to create an incubator in 1984 (200 companies created to date, 1000 jobs). The school offers rich and varied career paths: teacher-researchers have opportunities for professional mobility in the various IMT schools and can also take on responsibilities within the school's functional departments (studies, research, international, economic development, etc.) for part of their time.

At IMT Mines Alès, each person is a key player in our Sustainable Development and Social Responsibility (SD&RS) approach. We are committed to promoting environmentally responsible practices, fostering diversity and inclusion, and ensuring ethics in our operations. We encourage all our agents to take a responsible approach in their daily actions and to come up with innovative ideas that strengthen our positive impact on society and the environment.

The Centre for Research and Education in Environment and Risks (CREER)

Within the School, IMT Mines Alès, the Centre for Research and Education in Environment and Risks (CREER) conducts research activities in the fields of the industrial environment and risk. It brings together two research units:

- The HSM Joint Research Unit (HydroSciences Montpellier)
- The GARANCe Own Research Unit (Management of Industrial Activities and Risks to Prevent Future Changes)

The CREER Center also has 2 teaching departments ("Environment, Energy and Risks" and "Subsurface Engineering and Exploitation of Mineral Resources") and 4 technological platforms (DOREE, PAQMAN, SIMULCRISE and SPARK).

THE HSM UMR

The UMR HSM (University of Montpellier, IRD, CNRS, IMT Mines Alès) works on integrated water management using a wide range of skills capitalizing on research know-how in biology, chemistry, metrology, industrial ecology, geology, geostatistics, statistics and hydro(geo)logical modeling.

The UPR GARANCe develops its research around 3 major themes, the physics of accidental phenomena, the management of industrial discharges and the study of resilience and crisis management for anticipation to strengthen resilience and the ability to act in crisis situations.

The variety of these disciplines makes it possible to meet the major challenges related to water and air that require various skills (monitoring, treatment, modeling, management, etc.) allowing the team to integrate into multidisciplinary projects and to get involved in several circles and communities, thus amplifying its influence. The CREER center has thus reached a size that allows it to have a rich scientific dynamic and influence at the regional, national and international levels, particularly within the framework of joint doctoral contracts.

Job Description

To face the new challenges related to water management, both in terms of its quality and quantity, new paradigms have been emerging in recent years. Indeed, wastewater is now considered an important resource and its reuse after treatment is one of the solutions of the future to reintegrate it into the small water cycle and give it a second life. The Water Plan, launched by the French government in 2023, pays particular attention to the recovery of non-conventional water (NCW) and plans to increase its reuse from 1% to 10% by 2030.

Among the relevant solutions for wastewater management, phytoremediation technology appears to be an interesting alternative because of its low-tech nature and the co-benefits provided, such as increased biodiversity or air cooling thanks to the presence of plants as a central element of the process. Although this technology has been well known and well established in France since the 1990s, it still has obstacles that hinder its development on a larger scale, in particular its footprint and the significant use of mineral aggregates, the resource of which is under strong pressure,



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both globally and in France. Today, the use of alternative substrates to mineral aggregates, as well as the bioaugmentation of constructed wetlands (CWs), are emerging as avenues that have not yet been fully explored to intensify the sector and reduce the footprint of the soil.

This Post-doctoral fellowship is part of the PhytoReut project, funded by ADEME, led by an industrial partner (AQUATIRIS) and bringing together 4 academic partners (CRBE and LGC in Toulouse, G-EAU and HSM in Montpelier and Alès). This project is based on the development of a phytoremediation treatment device. The Post-doctoral fellowship will accompany a thesis aimed at the study of sustainable bio-based materials for the constitution of the substrate in CWs as a replacement for conventionally used mineral materials such as filter sand. The aim will be to test the purification capacities of these new substitute and bio-based substrates. The selection criteria (indicators) are the quality of the water produced in relation to the intended use ("reuse" irrigation regulations), the hydraulic performance of the filters, and their stability over time, the environmental constraints related to the supply and fate of bio-based materials, and the viability of biodiversity.

A mechanistic approach to the biophysical phenomena responsible for water remediation will be developed, distinguishing between them, such as the effect of the particle size of new biomaterials, the contribution of biodiversity in the intensification of water treatment (infiltration and biodegradation) and its robustness in the face of the presence of organic micropollutants (pharmaceutical molecules and PFAS).

Main missions:

The recruited post-doctoral fellow will oversee the implementation, monitoring and optimization of a laboratory scale CW pilot, as part of the PhytoReut project. At the same time, a doctoral student will be in charge of similar experiments in Toulouse, with different materials. A synergy between the different teams of the project is expected and the Post-doctoral fellow will also benefit from this data to support his or her work. This work will involve a strong experimental component, including participation in the construction and improvement of the pilot (solving technical problems, proposing constructive solutions, instrumentation of the device), and thus requires a strong appetite for manual work and in pilot conditions.

The project is based on an integrated scientific approach aimed at linking the hydraulic and purifying properties of bio-based materials to microbial dynamics and the effects of bioaugmentation, to understand the biophysical and biological mechanisms controlling the removal of nutrients, pathogens and micropollutants in CWs. A first experimental year is dedicated to the materials alone and their choices based mainly on their hydraulic, filtering and purifying properties. Bio-augmentation will be applied and studied during the second year with a follow-up of the colonization of the substrates, the structure and functions of the microbial communities (biodegradation, enzymatic activities) and their impact on the quality of the treated water.

The project is part of a global context of partnership with other laboratories already engaged in research on the coupling between non-conventional water production and irrigation (BIOROC project, WOc (Water Occitanie); BIOAUGMENTATION project, UNESCO ICIREWARD centre) and which cover environmental sciences, process engineering, physics, chemistry and computer science: CRBE, LGC, G-EAU, SME (EpurAqua, Aquatiris group).

Desired profile and general evaluation criteria

Minimum level of education and/or experience required :

- PhD in one of the fields related to chemical/process/environmental engineering with a good knowledge of effluent treatment
- Publications & Conferences



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Skills, knowledge and experience required:

- Strong background in environmental chemistry and/or process engineering applied to wastewater treatment
- Good knowledge of regulatory issues related to the reuse of treated wastewater for irrigation
- Skills in analytical chemistry and/or microbiology
- Process Engineering
- Environmental chemistry
- Scientific exploitation of results through the writing of reports and articles Analysis and interpretation of data

Skills, knowledge and experience appreciated:

- Knowledge of microbiology/microbial ecology and/or analytical chemistry
- An interest in the physico-chemical evaluation of bio-based materials at the end of their life
- Appetite for experimental work and transdisciplinarity
- Knowledge of Open Data Management
- Integration into a multidisciplinary team

Technical and transversal skills required:

- Dynamism
- Autonomy
- Involvement
- Teamwork
- Organizational skills
- Rigour and methodology
- Initiative
- Adaptability
- Intellectual curiosity
- Creativity and innovation

Your manager and the team in place will support you in the development of your skills, while valuing your experience and talents.

Application

Administrative conditions for application

The position offered by IMT Mines Alès is a 24-month, full-time, fixed-term contract, under public law under the provisions of the management framework of the Institut Mines-Télécom, profession P, Post-doctoral fellow, category II.

Salary: €35,400 gross per year.

How to apply

Applications (CV and cover letter) should be sent **exclusively to**: ⚠
https://institutminestelecom.recruitee.com/o/post-doctorante-materiaux-biosources-et-biodiversite-pour-des-filtres-plantes-innovants-dedies-au-traitement-et-a-la-reutilisation-des-eaux-usees-cdd-24-mois-imt-mines-ales

The people in charge of recruitment will study your application carefully.




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Recruitment schedule

A jury composed of several people will receive you and will make sure to put you in the best conditions to make this meeting a success.

Deadline for applications: **April 5, 2026**

Expected indicative date of the jury: **April 15,2025**

Desired start date: **June 1,2026**

Contacts

If any elements of the application require further clarification, please do not hesitate to contact the following persons:

On the content of the position:

Andrés SAUVÊTRE, Lecturer and researcher of the CREER center
: andres.sauvetre@mines-ales.fr

François LESTREMAU, Lecturer and researcher of the CREER center
: francois.lestremau@mines-ales.fr

On the administrative aspects:

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Job Integration

A serene integration for a successful start to the position

As soon as you arrive, you benefit from an integration period to help you discover your missions and your work environment. You will be welcomed by your HR referent, who will guide you through all the steps necessary for a serene start to your position.