


IMT Mines Alès
École Mines-Télécom


SCIENCE & CREATIVITY TO INVENT A SUSTAINABLE WORLD

NOUS RECRUTONS

Post-Doctoral Researcher

Physics-informed artificial intelligence for hydrogeological modelling

Etablissement :	IMT Mines Alès (National School of Mines of Alès)
Affectation principale :	Research and Teaching Centre for Environment and Risks (CREER) - HydroSciences Montpellier (HSM)
Résidence administrative :	Alès (Gard Department – Occitanie Region)
Contract Type:	13-month Fixed-Term Contract - Public Law Contract – Full Time
Start Date:	**October 1, 2026**

Presentation of Our Institution and CREER

The Institut Mines-Télécom

The Institut Mines-Télécom (IMT), a grand établissement within the meaning of the Education Code, is a public scientific, cultural and professional institution (EPSCP) under the primary supervision of the ministers responsible for industry and digital technology. As the leading group of engineering schools in France, it brings together 11 public engineering schools across the country, training 13,500 engineers and doctoral graduates. IMT employs 4,500 people and has an annual budget of €400M, of which 40% comes from its own resources. IMT includes 2 Carnot institutes, 35 industrial chairs, annually produces 2,100 rank-A publications, 60 patents, and carries out €110M in contract research.

IMT Mines Alès

School mission: “Building on its membership in IMT and its regional roots, IMT Mines Alès gives its students the best opportunities to succeed professionally and become responsible contributors to national development while preserving the planet’s resources.” Our core values: boldness! commitment, sharing, excellence.

Founded over 180 years ago, IMT Mines Alès currently has 1,400 students (including 250 international students) and 380 staff. It has two campuses in Alès and is also located in Montpellier and Pau. Its students include general engineers, specialist engineers (through apprenticeship programmes), doctoral candidates, and master’s or specialized master’s students. It also hosts over 500 trainees in continuing professional education.

The school has 3 high-level scientific and technological research and teaching centres, working in the fields of materials and civil engineering (C2MA), environment and risks (CREER), and artificial intelligence, industrial and digital engineering (CERIS). These entities bring together approximately 85 permanent academic researchers (half of whom hold HDR accreditation), 40 research support staff, and 100 doctoral and post-doctoral researchers, producing each year over 130 rank-A publications and €3M in research contracts, of which one third are direct contracts with

companies. These research staff contribute to 6 research units, including 4 UMRs. IMT Mines Alès is accredited to award doctoral degrees in 4 doctoral schools.

It has 12 technological platforms and 1,600 partner companies. Creativity is a core characteristic that permeates all its activities. The school was the first to establish a business incubator in 1984 (200 companies created to date, 1,000 jobs). The school offers rich and varied career paths: faculty researchers have opportunities for professional mobility across the various IMT schools and may, if they wish, take on responsibilities within the school's functional directorates (academic, research, international, economic development, etc.) for part of their time.

IMT Mines Alès is a Sustainable Development & Corporate Social Responsibility (DD&RS) certified institution. Within the school, every person is a key player in our approach. We are committed to promoting environmentally responsible practices, fostering diversity and inclusion, and ensuring ethical conduct in our activities. We encourage all our staff to adopt a responsible approach in their daily actions and to put forward innovative ideas that enhance our positive impact on society and the environment.

Description of the Research and Teaching Centre for Environment and Risks (CREER)

Within IMT Mines Alès, the Research and Teaching Centre for Environment and Risks (CREER) conducts research activities in the fields of industrial environment and risk. Its research staff participate in:

- The UMR HydroSciences Montpellier-HSM joint research unit (University of Montpellier, IMT Mines Alès, CNRS, IRD),
- Or the "Study of Risks and Air Quality" team (EUREQUA)

Staff integrated in HSM work on integrated water management using a broad range of competencies drawing on research expertise in biology, chemistry, sensor measurement and development, industrial ecology, geology, geostatistics, statistics, and hydro(geo)logical and statistical modelling (Machine Learning).

The diversity of these disciplines enables the team to tackle major water-related challenges that require varied skills (monitoring, sensor network deployment, modeling, management, etc.), allowing the school's staff to participate in multidisciplinary projects and engage with various networks and communities, thereby expanding its influence. HSM's research team comprises 10 Assistant Professor (including 4 with HDR status), 3 technicians and engineers, 5 postdocs, and 9 doctoral students. This scale fosters a vibrant scientific dynamic and ensures regional, national, and international influence, particularly through joint doctoral supervision agreements. The research conducted by IMT faculty members takes place within five of the six teams at the HSM UMR. This UMR is heavily involved in projects and observatories, some of which are located in the Global South (e.g., Tunisia and Côte d'Ivoire), as well as in the observation networks of the IR OZCAR (the MEDYCYSS observatory, affiliated with the OSU OREME and the SNO KARST) and the workshop zones (ZABR). The successful candidate will contribute in particular to research activities conducted within the cross-cutting theme "Characterization and Modeling of the Eco-hydro(geo)logical Functioning of the Critical Zone", and, more specifically, in hydrogeology as part of the HYTAKE team (Hydrogeology and Transport in Karstic and Heterogeneous Aquifers).

Job description:

The position forms part of the PREV'IA project, an ambitious research initiative focused on understanding and forecasting water resources in the Pliocene-Quaternary aquifer of the Roussillon plain, and the source of the Lez, which supplies Montpellier with drinking water. It follows on from several projects and PhD theses carried out at HydroSciences Montpellier, covering both low-flow and flood conditions at the source of the Lez. The work required will build on an ongoing PhD thesis within the UMR HSM (HYTAKE team), focusing on the sustainability of the karst water resource (Lez aquifer) supplying a Mediterranean city (Montpellier) in the context of climate change.

This postdoctoral position will involve using emerging concepts in 'Physics-Informed Machine Learning' (PIML) approaches to assess the benefits of a synergy in hydrogeological modelling: (1) concept-based on the one hand, and (2) based on neural networks informed by, or complemented by, physics. The PIML (Physics-Informed Machine Learning) approach is developing along two main lines: (i) Physics-Informed Architectures (PIA): the integration of




physical knowledge into the model architecture (hidden layers); and (ii) Physics-Informed Loss Functions (PILF): a combination of physical modelling (differential equations) and black-box modelling, merged within the cost function (regularisation term). Both methods may be explored.
The proposed models may be used to determine the evolution of several hydrological parameters in response to climate change; this work will complement the work currently underway within the UMR HSM (HYTAKE team).
The key terms to consider are reservoir modelling, PIML, PIMF, PINNs, hydrology, karst, groundwater recharge, low water levels, uncertainties, climate change, changes of scale, uncertainties, non-stationarity, methods for describing distributed and time-varying phenomena, geomatics,
The research activities of the successful candidate will form part of a sustainable development approach based on the United Nations' Sustainable Development Goals (SDGs), in particular Goal 6 concerning the increasing scarcity of water resources and their sustainable management.

Candidate Profile and General Evaluation Criteria

Your supervisor and the existing team will support you in developing your skills, while valuing your experience and talents:

Minimum Required Education and/or Experience:

Beyond your degree, your personality will make the difference.

Applicants must have:

- PhD in a field related to hydrogeology, hydrology, or environmental modeling

Required Skills, Knowledge and Experience:

- Experience in machine learning for modeling complex natural phenomena
- Applying skills in multidisciplinary projects
- Genuine ability and experience in organization and teamwork: organizing meetings, planning activities, contributing to the drafting of administrative documents
- Good command of scientific English

Required technical and soft skills:

- Dynamism
- Autonomy
- Commitment
- Teamwork
- Organisational skills
- Leading training, research or collaborative projects
- Rigour and methodology
- Initiative
- Adaptability
- Intellectual curiosity
- Creativity and innovation

From an administrative standpoint, the successful candidate will be based at HydroSciences Montpellier, reporting administratively to the head of the CREER Center (IMT Mines Alès) and scientifically to the Director of HSM. The candidate will conduct research in Montpellier in close collaboration with Mr. Jourde and Mr. Bondu, as well as with the HSM teams based in Alès.

Candidature

Administrative Application Requirements

The position offered by IMT Mines Alès is a 13-month fixed-term contract, full-time, governed by public law under the management framework of the Institut Mines-Télécom, job category P, Post-doctoral researcher, category II.

Salary: €35,400 gross per year.




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Application Process

Applications (CV and cover letter) should be sent **exclusively to** :
https://institutminestelecom.recruitee.com/o/post-doctorante-en-intelligence-artificielle-informee-par-la-physique-pour-la-modelisation-hydrogeologique-cdd-13-mois-imt-mines-ales

The recruitment team will carefully review your application.

Recruitment Timeline

A panel of several people will meet with you and will ensure you are given the best conditions to succeed in the interview.

Application deadline: **July 16, 2026**

Panel's decision: **Second half of July**

Desired Start Date : **October 1, 2026**

Contact Persons

If you need further clarification on any aspect of the application, please feel free to contact the individuals listed below :

Regarding the job description:

Anne JOHANNET, Project Manager for PREV'IA
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Juliette CERCEAU, HSM Coordinator
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Hervé JOURDE, HSM-HYTAKE
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Regarding administrative matters:

Géraldine BRUNEL, Director of Human Resources
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Onboarding

A smooth integration for a successful start

From your first day, you will benefit from an integration period to help you discover your responsibilities and your working environment. You will be welcomed by your HR contact, who will guide you through all the necessary steps for a smooth start.