

This full research position application should be opened on february 12, 2024.  
Deadline for application should be March 15, 2024.

## Job description-Recruitment 2024

### Chargé·e de recherche (Normal Class) of Sustainable Development

(Chargé·e de recherche de classe normale du développement durable - CR CN)

CR CN

\*\*\*\*\*

### Centre for Studies and Expertise on Risks, the Environment, Mobility and Urban Planning (Cerema)

\*\*\*\*\*

**Job title :** Researcher in outdoor sound propagation  
**Organisation/Agency :** Centre for Studies and Expertise on Risks, the Environment, Mobility and Urban Planning (Cerema), <https://www.cerema.fr/en>  
**Scientific domain(s) :** Acoustics (skills category : primary SPI3, secondary SPI1, DE9)  
**Scientific specialities :** Physical acoustics  
**Host laboratory or structure :** Joint Research Unit in Environmental Acoustics (UMRAE), <https://www.umrae.fr/en/>  
**Location :** Strasbourg  
**Contact(s) :** David ECOTIERE, deputy-director UMRAE, [david.ecotiere@cerema.fr](mailto:david.ecotiere@cerema.fr)

\*\*\*\*\*

#### 1-Context

Cerema is the public institution dedicated to supporting public policies in the fields of planning, territorial cohesion and ecological and energy transition. It is under the dual supervision of the Ministry of Ecological Transition and the Ministry of Territorial Cohesion and Relations with Local Authorities. With its transversal know-how, multidisciplinary skills and strong innovation and research potential, it promotes and facilitates innovations in the territories, contributes to the development of best practices by taking into account territorial concerns, and mobilises knowledge, scientific and technical know-how and innovative solutions for the ecological transition. As such, it works with State services, local and regional authorities and economic players to support them in their projects, in its six main areas of activity: territorial engineering, building, mobility, transport infrastructure, environment and risks, and sea and coastline. Since 2020, Cerema has been accredited by the French National Research Agency through its Carnot Institute Clim'Adapt, which has established a policy of transferring scientific knowledge and know-how to socio-economic players. Its scientific action is structured around its 11 research teams, which are currently developing or strengthening their partnerships with academic teams. As such, since 31 August 2021, Cerema is one of the organisations recognised by the MESRI as an establishment whose statutes provide for research missions and, as such, is subject to evaluation by Hcéres.

One of Cerema's priorities in terms of innovation and research is the reduction of environmental pollution, particularly noise pollution. This theme reflects the long-term concerns of the French government, the World Health Organisation and the European Environment Agency in terms of human health. Among the major environmental impacts of mobility, and more generally of urban and peri-urban infrastructure and systems, noise is a major social issue, with a significant impact on health (damage to hearing, cardiovascular effects, stress, sleep disturbance) and a very high economic impact, estimated at €147 billion per year in 2021. Noise, particularly from transport, is also the nuisance most cited by French people, equally with air pollution. To meet these challenges and provide solutions, national and European legislation have been in place for several years to regulate noise pollution. In particular, Directive 2002/49/EC on the assessment and

management of environmental noise stresses the need to inform local residents of the risks and effects of environmental noise (via noise maps, for example), and to adopt action plans for noise prevention and reduction.

To address this major societal challenge, the Joint Research Unit in Environmental Acoustics (UMRAE), under the supervision of Cerema and Gustave Eiffel University, is carrying out activities to assess, characterise, model and reduce the impact of environmental noise, by conducting research following 3 axis: (1) sources of environmental noise (acoustic emissions from road and railway vehicles, acoustic optimisation of road surfaces, noise from energy production sources such as wind turbines, etc. ); (2) propagation of noise in the environment (from great distances to the scale of a building, the effects of vegetation, soil effects, surface roughness and topography, the acoustic properties of environmental materials, etc.); (3) impact of noise on humans and biodiversity (noise prediction tools, characterisation of urban noise environments, sensor networks for noise monitoring, etc.). The aim of the research is to improve scientific knowledge; to disseminate results concerning the generation, propagation and impact of noise in the environment; to develop acoustic prediction tools for use by planners and specialists; and finally, to propose solutions for reducing and protecting against noise. The general approach of the research is based, on the one hand, on strong disciplinary research and, on the other hand, on scientific collaborations with other disciplinary fields of the human and social sciences or engineering sciences, in order to have a systematic vision of the problematic.

## **2-Job content:**

The researcher will carry out research into propagation of noise in outdoor complex environment (inter-urban, forests...). The work may be carried out using a numerical or analytical modelling approach, as well as experimentally. The aspects addressed will involve taking into account the phenomena influencing acoustic propagation in noise prediction methods: the effects of buildings, obstacles, facades, ground properties, micro-meteorology, etc. One aspect of the researcher's work could also include the important issue of estimating the uncertainties involved in predicting or characterising environmental noise.

Most of the research work will mainly come under axis 2 of the unit's scientific project (propagation of noise in the environment), but there will also be strong interactions and applications with other axis: sources of transportation noise or new emerging noise sources (axis 1), characterisation and improvement of the noise environment or the impact of anthropogenic noise on biodiversity (axis 3). As well as being disseminated within the scientific community, the research work is intended to be used in tools, documents or methods that can be used by engineering companies or civil society players. This is an important aspect of the research unit, which develops and makes available various products of this type.

The aim of the research carried out on propagation will be to anticipate the noise environments of "tomorrow", by incorporating the scientific challenges that emerging new sources of noise may present for acoustic propagation: new kind of mobility for goods and people (new motorisations, drones, flying taxis, etc.), new sources of noise related to the energy transition or climate change (off-shore and on-shore wind farms, anti-frost towers, heat pumps, tidal turbines, etc.). At a later stage, the work could also be extended to marine or underwater environment.

The researcher is expected to produce, supervise and participate in the development of research programmes at various levels (regional, national, international). In particular, he/she is expected to have a significant level of publication in leading international peer-reviewed journals. He/she will also be involved in the collective scientific life of his/her research unit and institution.

In addition, the researcher is also expected to have a diversified activity on all or part of the following activities:

- Teaching, research training (teaching, supervision of trainees, doctoral and post-doctoral students, thesis reports and participation in thesis juries, participation in scientific committees related to teaching);
- Scientific outreach and leadership (activities as a member of scientific societies, editorial committees, scientific committees of institutes, colloquia, specialist commissions, network leadership, expertise in journals, editorial committees, etc.) and scientific culture dissemination activities (scientific mediation, opening up science to society, etc.);
- Valorization and transfer activities (research and industrial contracts, expertise and consultancy activities, transfer of research results to the socio-economic world, contribution to the development of public policies, dissemination of scientific culture);

- International activities (participation in European projects, ongoing international collaborations, contributions to the international visibility of Cerema).
- Scientific expertise (membership of scientific societies, editorial boards, scientific committees of institutes or conferences, experts commissions).

### **3-Expected profile**

The candidate must have a PhD in Acoustics, or be able to justify an equivalent level, especially for foreign applicants (publications, supervision, and experience of scientific management of research projects, teaching).

The candidate must exhibit a significant production of scientific publications (peer-reviewed international journals or international conferences). An international experience would also be appreciated.

Specific skills and knowledge:

- Acoustics: propagation, numerical modelling, experimental assesment.
- Proficiency in at least one scientific programming language. Ex: Python, Matlab, R...
- Team spirit, and good listening and summarising skills
- Good French and English language skills

### **4-Recommendations**

The candidate is expected to propose, in his/her application, a scientific project for the position that is consistent with the activities of the host research team and is therefore strongly recommended to contact the persons indicated.