



laboratoire eau environnement systemes urbains



WATER AND SOIL IN A SUSTAINABLE CITY



UNIVERSITÉ
PARIS-EST CRÉTEIL
VAL DE MARNE

ANALYTICAL AND FIELD PLATFORMS

Leesu is a member of the **Prammics platform (Plateforme Régionale d'Analyse Multi-Milieux des Micro-Contaminants)** of the OSU-Efluve and has its own **scientific and technical platforms**:

- Sampling (passive, grab and automatic)
- *In situ* high frequency measurements (physico-chemistry, flows, water content, CTD profiles, nutrients, phytoplankton, cyanobacteria, Fluocopée® probe, etc.)
- Analysis of organic, inorganic and biological contaminants and their effects
 - > *Global parameters* (ion chromatography, 3D spectrofluorometer, carbon analyser, etc.)
 - > *Micropollutants* (SPE extraction, microwave, GC-MS, UPLC-MS/MS, UPLC-IMS-QTOF, ICP-MS, etc.)
 - > *Microplastics* (μ FTIR, pyr-GC/MS) and *macroplastics* (DataPlast platform)
 - > *Pathogens and microbial communities* (microplate readers, real-time thermocyclers, electrophoresis and imaging systems, etc.)
 - > *Ecotoxicology* (animal and algal model farms, zebra-box, fluorescent microscope, binocular magnifier, etc.)



TEACHING

- **École des Ponts ParisTech:** Introduction to life sciences, City Environment Transportation Department, Franco-Brazilian cooperation programme for the training of engineers (*Brafitec*)
- **Université Paris-Est Créteil**
 - > IUT Sénart-Fontainebleau: Bachelor QHSSE, BUT Environmental Sciences and Ecotechnologies
 - > *Faculty of Science and Technology:*
 - Bachelor: Chemistry, Life and Earth Sciences
 - *Master's degree:* Aquatic Systems and Water Management (SAGE) - Management of the Environment for Communities and Companies (MECE) - Bioinformatics and Multi-omics Engineering (Biomics) - Analysis of Food-related Health Risks (ARSA) - Biological Engineering for the Environment (IBE) - Analysis and Quality Assurance (AAQ)





OVERVIEW

25 Researchers /
teachers-
researchers

35 PhD students

10
Postdoctoral fellows

12 Technical and
administrative staff

About 40
on-going projects

The **Water, Environment and Urban Systems lab** (Leesu) is a French research laboratory in **environmental sciences**, specialized in studying **water and its management in urban and peri-urban environments**. It is a joint laboratory between École des Ponts ParisTech and universit  Paris-Est Cr teil.

Leesu's main focus of research is **water in the city**. Facing the challenge of making the **city sustainable and resilient** in the context of **global changes**, the lab aims to gain a better understanding of water and contaminant flows in the urban environment and to develop innovative concepts for water and soil management.

Through **interdisciplinary** and **multi-scale approaches**, Leesu focuses on different aspects of global changes: climate, hydrology, urban planning and architecture, regulations, practices, uses, management methods, pollution.

Leesu's research relies on **experiments and demonstrators** to study the impact of global changes, the dissemination of innovations, the emergence of new sectors, the brakes and levers, the positioning of users and territorial compatibility. Leesu is committed to transferring its knowledge to local authorities, the industry and the general public.

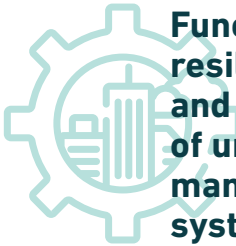
LEESU'S RESEARCH IS DIVIDED INTO THREE THEMES



Innovations for sustainable water and urban management

Assess performance, optimise operation and characterise the conditions for the **deployment of innovations in urban water and sanitation management**.

Conduct socio-technical studies: *improving existing systems, breaking with dominant frames of reference, changes in practices by city actors (builders, inhabitants, activists, associations, etc.).*



Functioning, resilience and adaptation of urban water management systems

Study of the **socio-technical object/sector/city continuum** in a context of **global changes** using a systemic approach.

Assess the effect of *changes* on existing urban systems and the impacts of the *deployment of technical solutions or practices, analyse their resilience and provide models and scenarios of adaptation*.



Protection of ecosystems and natural resources

Study **global changes and their impacts on receiving environments** (soil, water bodies and rivers).

Deploy *new indicators and cross-cutting approaches (physical, ecological, biogeochemical and socio-political dynamics)* to monitor changes in sanitary and environmental quality and to study the functioning of ecosystems in receiving environments.



EXPERTISES

Source separation of urine and faeces

Alternative techniques for urban stormwater management

Innovative wastewater treatment

Greywater reuse

Rainwater harvesting

«Smart» management methods

Development of autonomous probes and measuring stations

EXPERTISES

Measurement and modelling of contaminant flows (micropollutants, nutrients, macro / microplastics, pathogens)

Durability

Performance and appropriation of structures

Urban metabolism

Monitoring of system management, consumption and maintenance practices

EXPERTISES

Coupled hydrodynamic and biogeochemical modelling

High-frequency observation systems

Macro-micro plastic monitoring

Risks related to bathing

Ecotoxicological assessment of soils and waters

Diagnosis and rehabilitation of polluted soils

PARTNERSHIPS

Leesu has forged **lasting partnerships with**

- Institutional actors (OFB, AESN...),
- Operational actors (SIAAP...),
- Local authorities in the Paris region (City of Paris, departmental councils, etc.)
- The industry in the water sector
- Research-Communities Association in the Water Sector in Ile-de-France (Arceau).

Leesu conducts **federative research** within:

- OSU-Efluve
- ZA-Seine (OPUR, Piren-Seine, GIPS Seine-Aval)
- Labex Urban Futures
- Urban hydrology observation system (URBIS)
- SNO-Observil
- Lake Observatory (OLA)
- French Geochemical and Experimental Network (REGEF)
- Île-de-France Federation for Environmental Research (FIRE)
- DIM Material heritages - innovation, experimentation and resilience (PAMIR)

Leesu is recognised in national (AFNOR, ANSES, ASTEE, ATEP, Ineris) and international (NORMAN) networks of experts.

Do not throw on the public highway

CONTACTS

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 @laboLeesu

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