



AIR

SOIL

ENVIRONMENTAL SCIENCE

WATER

BUILDINGS



OSU-EFLUVE

**Observatory of Earth and Space Sciences:
Fluid Envelopes from the Urban Scale
to Astrobiology**



Université de Paris



École des Ponts
ParisTech



UNIVERSITÉ PARIS-EST CRÉTEIL



OBSERVATOIRE
DES SCIENCES
DE L'UNIVERS

Université Paris-Est Créteil Val de Marne (UPEC)

Maison des Sciences de l'Environnement

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THE OSU-EFLUVE UNIT FEATURES:

- > Some 300 research professors, technicians and administrative staff, plus roughly sixty Ph.D. students
- > 5 founding laboratories, 4 oversight institutions (University of Eastern Paris-Créteil (UPEC), CNRS-INSU, Ecole des Ponts ParisTech and the University of Paris)
- > An internal school of UPEC and a joint research unit (UMS 3563)
- > 16 observation centers, nationally-renowned testing facilities, instrumented sites, open codes, an analytical platform comprising mineral, organic and biological clusters
- > Shared services: an extensive database being compiled and a mechanical engineering platform

THE OSU MISSION STATEMENT

OSU-EFLUVE is devoted to research, training and information dissemination in the field of environmental science:

- long-term observation of environmental variables in air / water / soil media and in buildings
- publication of data collected at the national or international levels
- execution of research projects
- implementation of shared platforms or services for improving research practices
- dissemination of knowledge in the field of Earth and Space Sciences
- continuing education and expert advice intended for socioeconomic actors
- hosting of scientific events and corresponding communication.

In a context dictated by strong human-induced pressures on the environment, the studies undertaken by OSU-EFLUVE are aimed at both improving understanding of how these various media operate and developing mitigation solutions.

MULTIDISCIPLINARY RESEARCH FOCUSED AT THE INTERFACES

- > Environmental science, studying air, water, soil and buildings in an integrative manner
- > Extensive specialization in urban and manmade settings, yet with a keen interest as well in tropical zones, deserts and extraterrestrial atmospheres
- > A set of activities that encompass field and laboratory experimentation along with numerical modeling
- > Subject areas addressed: physics, chemistry, biology, hydrology, and the material sciences

OSU-EFLUVE's annual internal call for tender

Promote the development of integrative research positioned at the interfaces of air/water/soil/built structures.

Response to large-scale tender offers (Make Our Planet Great Again, the Make Air Quality Great Again project - "MAQGA"):

Low-cost sensors, satellites and models to measure and predict air quality with high resolution in Paris and Sub-Saharan Africa.

FOUNDING

LABORATORIES

OSU-EFLUVE IS A RESEARCH FEDERATION OF FIVE LABORATORIES:



CEREA (Center for the Study and Research of the Atmospheric Environment) - Ecole des Ponts ParisTech, EDF R&D

Dynamics associated with the lower layers of the atmosphere, study of atmospheric pollution at scales extending from the continent to localities, development of mathematical methods applied to the environment for data assimilation and inverse modeling.



CERTES (Center for the Study and Research of Heat, the Environment and Systems) - UPEC

The physics, metrology and engineering of energy and matter transfers relative to the environmental quality of buildings. This center's experimental and numerical skills offer the capability of conducting research and generating both theoretical and applied expertise on: the environmental quality of indoor air, improvements to energy efficiency in buildings, and innovative materials.



LEESU (Laboratory on Water, the Environment and Urban Systems) - UPEC, Ecole des Ponts ParisTech

Analysis of how urban water management systems operate, resist and adapt to global changes. Research conducted by LEESU is also focused on understanding and characterizing human-induced pressures and their impacts on receiving environments. Moreover, the projects funded serve to lead or accompany innovations to better ensure the sustainable management of both water and urban services.



LISA (Joint University Laboratory of Atmospheric Systems) - UPEC, CNRS, University of Paris

Understanding of the mode of operations for terrestrial and planetary/cometary atmospheres, including impact studies tied to changes in atmospheric composition (in particular caused by human activities), e.g. atmospheric pollution, the impact of particulates on climate, the effects on buildings.



IEES Paris (Paris Institute of Ecology and Environmental Science), Créteil team - UPEC

Explanations and quantifications of the mechanisms at work during the constitution and operations of ecological and environmental systems. Studies of the interactions taking place between soil organisms (plants, macrofauna and microorganisms). Impact analyses of global changes (e.g. pollution, human settlement) on these organisms and their interactions.

LONG-TERM OBSERVATIONS

TESTING FACILITIES / INSTRUMENTED SITES / NUMERICAL CODES

NATIONALLY-CERTIFIED OBSERVATION CENTERS

- > INDAAF / SNO* International Network to study Deposition and Atmospheric Chemistry in Africa (LISA, in collaboration with LA/OMP)
- > MOMA-GC / SNO Mars Organic Matter Analysis (LISA)
- > OLA / SOERE** Observatory of Alpine Lakes (LEESU)
- > OPUR / Paris Region Urban Pollutant Monitoring Site (LEESU)
- > SAM / SNO Sample Analysis on Mars (LISA)
- > SSHADE-F / SNO Solid Spectroscopy Hosting Architecture of Databases and Expertise (LISA, in collaboration with IPAG/OSUG).

OTHER UNITS

- > OASIS / Atmospheric Observations by Solar Infrared Spectroscopy (LISA)
- > OBSOLU / Urban Observatory for studying Anthropogenic Soils stemming from formerly derelict land (IEES Paris and LEESU)
- > HBAO / Henties Bay Aerosol Observatory (LISA)
- > PANISSE / Platform for the Analysis of In Situ Building Insulation Levels by means of Energy Monitoring (CERTES).

NATIONALLY-RENOINED TESTING FACILITIES

- > CESAM / Experimental Multiphase Atmospheric Simulation Chamber (LISA)
- > PEGASUS / Portable Gas and Aerosol Sampling Units (LISA).

INSTRUMENTED SITE

- > SIRTA / Instrumented Site for Research on Remote Atmospheric Detection (CEREA, in collaboration with IPSL).

NUMERICAL CODES

- > "CHIMERE": Regional chemistry and transport simulation model for air pollution, labelled "national numerical code" (LISA)
- > "Polyphemus": Air quality modeling platform comprising several air quality models (CEREA)
- > "Code_Saturne": Fluid dynamics computation code intended for atmospheric fluids (CEREA).

* SNO: National Observation Center

** SOERE: Observation and Experimentation Center, dedicated to long-term environmental research



PLATFORMS

REGIONAL PLATFORM FOR CONDUCTING MULTIMEDIA ANALYSES OF MICRO-CONTAMINANTS

OSU-EFLUVE has set up a multimedia environmental analysis platform by tapping into the technological prowess of its partner laboratories, in particular LISA, LEESU and IEES Paris, that focuses on analyzing the chemical and biological traces present throughout the environment. The objective of this PRAMMICS platform, primarily located at UPEC's Environmental Science Center, is to create a nationally-renowned team of analysts in the field of environmental science, open to academic partners, the corporate world and public-sector institutions, through joint-venture projects and collaborative services.

Equipped with over 40 instruments, the PRAMMICS platform is laid out around three sections dedicated to organic, inorganic and biological analyses, encompassing specific analytical facilities essential to testing a broad array of micropollutants and so-called nutritional trace elements in the air/water/soil matrices. This platform relies on the expertise and competences possessed by OSU-EFLUVE's participating laboratories.

Each section features state-of-the-art scientific equipment capable of ensuring analyses meet the requisite sensitivity, selectivity, accuracy and repeatability while spanning the entire analytical chain, i.e.:

- sample preparation
- sample processing
- the actual analysis.

PRAMMICS' advantages:

- > Multimedia focus: air/water/soil
- > Wide spectrum of organic, inorganic and biological analyses
- > The highest possible molecular specificity, sensitivity at the level of ultra-traces
- > Recognition of the full analytical chain
- > Open to outside interests, a service offering designed for companies and organizations.

DATABASE

Collection, archival and dissemination of data*

MECHANICAL ENGINEERING WORKSHOP

Prototyping and assembly, 3D printer

* Currently under development



CONTINUING EDUCATION PROGRAMS

Emphasis on training modules focusing on key environmental issues (air/water/soil/built structures): Within the scope of the Regional Multimedia Analysis Platform dedicated to Micro-Contaminants (PRAMMICS), development of targeted training programs or service offerings.

For further information:
osu-prammics@u-pec.fr

Creation of a UPEC “Environmental Science” event: Environmental Science Days (JSE) or other educational sessions.

E-Learning FEDER project - Health and air quality: AIRDUCATION knowing, understanding, acting: design of 4 modules, instructional engineering. Accreditation of a university degree program in Health and Environment.

For further information: www.airducation.eu

SCIENTIFIC EVENTS

ENVIRONMENTAL SCIENCE DAYS (JSE)

Multidisciplinary meetings on major environmental issues, intended for students, researchers, local-level actors and agency personnel, UPEC personnel as well as the general public. Coordinated as a partnership between UPEC, the Val-de-Marne Departmental Council, the University of Paris and the Ecole des Ponts ParisTech institution, these Science Days offer a synopsis of the current state of knowledge in a topical field (pollution, health, climate, biodiversity, etc.) through a multidisciplinary approach including the human sciences. Conferences, and roundtables set the stage for direct debates alongside the scientific presentations. This event lies within the curriculum of two Master’s-level degree programs: “Risks and the Environment”, and “Science and Technology for Agriculture, the Food Industry and the Environment”.

PRAMMICS’ MORNING SESSIONS

Webinar showcasing the instruments used for conducting organic, inorganic and biological analyses.

TOPIC-DRIVEN CURRICULUM

Organizational assistance and support for topic-specific school programs (e.g. urban environment, spectroscopy, astrobiology).

SCIENTIFIC PATHWAY

Daylong discovery tour with field visits of observation sites and laboratories designed for researchers, staff, institutional participants and partners, as well as members of the general public.

SCIENTIFIC MEETINGS

Seminars and presentations organized among the OSU’s founding laboratories.

CONFERENCE SCHEDULE

- In collaboration with the Public University of Water and Sustainable Development (UPEDD) sponsored by the Val-de-Marne Departmental Council, plus participation of the Inter-Age University (UIA)
- OSU - Mondor Biomedical Research Institute (IMRB): “When environmental science meets the health sciences”.