THE UNIVERSITY OF REIMS CHAMPAGNE-ARDENNE

has recognized skills and indispensable know-how in the study **management of soils**. All our technical resources and scientific skills enable us to recommend solutions for the preservation of soil fertility, structure, biodiversity and quality. In this way, we contribute to the protection of water, the countryside, balanced ecosystems and agricultural production.

Expertise for the study and conservation of soils

Biodiversity
- Study of micro / macrobiome interactions and microbial / enzyme consortia
- Study of microorganism / pollutant interactions
- Study of lignocellulosic substrate / microorganism interactions
- Study of microbial responses according to the physical and chemical characteristics of soils
- Study of the microbial diversity of soils

Soil fertility
- Biodegradation of plant biomass in soils (crop residues, roots, by-products, mulch), composting, retting
- Stabilisation of carbon in the soil
- Mineralisation and recycling of mineral nitrogen
- Greenhouse gas emissions: (N_2O, CO_2)
- Functional features of microbial communities
- Agricultural management of plant biomass and ecosystem services

Surfaces, properties and dynamics of soils
- Geomorphology (study of landforms and their formation processes)
- Study of mass wasting
- Study of surface runoff and erosion
- Hydrodynamic processes
- Topography (LIDAR) and GIS mapping
- Study of the retention power of soils
- Multi-scale physical and chemical characterisation
- Microbial diversity of soils

Soil water and groundwater
- Study of the piezometry, flow and quality of groundwater bodies
- Study of contaminant transfer in aquifers
- Measurement of surface water and groundwater flow (hydrometry)
- Optimised performance of innovative retention basins
- Study of water retention and soil permeability
- Study of the behaviour of organic contaminants (pesticides, pharmaceuticals, PAHs, etc.) and inorganic contaminants (metallic trace elements)

Soil pollutants
- Behaviour and transfer of organic and inorganic pollutants in soils, sediments and bio-waste (WWTP sludge, digestate, etc.)
- Speciation of organic pollutants (pesticides, pharmaceuticals, etc) and metallic trace elements
- Interactions between organic pollutants and inorganic pollutants

Modelling
- Biodegradation of organic matter in soils
- Coupling of C and N cycles
- Hydrodynamic and hydrochemical modelling
- Geochemical modelling of the behaviour and transfer of pollutants
- Statistics: indicators and typology of organic matter degradation

5 MAIN RESEARCH AREAS

- Study of soil fertility and biodiversity
- Study of the surface, properties and dynamics of soils
- Study of soil water and groundwater
- Study of organic and inorganic soil pollutants
- Modelling of inherent soil processes

CHIFFRES CLÉS

30 Researchers and teacher-researchers

1 patent

+ than 10 industrial collaborations

6 European projects obtained in the past 5 years

3 laboratories *

* UMR 614 URCA/INRAE Fractionnement des Agro-Ressources et Environnement (**FARE**)
UMR 7312 URCA/CNRS Institut de Chimie Moléculaire de Reims (**ICMR**)
EA 3795 Groupe d'Etude sur les Géomatériaux et Environnements Naturels Anthropiques et Archéologiques (**GEGENAA**)

For applications in

- Agriculture
- Environment
- Agronomy
- Healthcare
- Viticulture
- Geography
- Pollution control
- History

Agrosciences, Environnement Biotechnologies, Bioéconomie

UNIVERSITÉ DE REIMS CHAMPAGNE-ARDENNE

State-of-the-art equipment at the service of our researchers and industry network

Fertility and biodiversity

- Environmental test chambers and rainfall simulators
- Elemental and soluble C and N analysers
- Gas analysers (N2O, CO2), and automated sampling device
- Laboratory for Stable Isotope Analysis (LADIS) (12C / 13C, 14N / 15N)
- Biochemical analyses of plants
- Enzyme analyses of soils
- Fluorescence, UV-visible, IR spectrophotometers

Surfaces, properties and dynamics of soils

- Instrumented soil incubators
- LIDAR imaging
- Geographic Information System (GIS)
- Inclinometer
- Tacheometer
- Rainfall simulator
- Soil stability analyser
- Equipment for chemical and physical characterisation of soils

Soil water and groundwater

- Instrumented soil incubators
- Manual and automatic piezometric probes
- Infiltrometers
- PIREE stream gauging rod
- Current meter
- Multi-parameter probes
- Automatic samplers
- Pumps for borehole sampling
- Membrane pressure apparatus
- Hydrodynamic modelling software

Soil pollutants

- Instrumented soil incubators
- Micro X-ray fluorescence
- Analysis of metallic trace elements (MTEs) and nanoparticles (ICP-OES, ICP-QQQ)
- Analysis of organic contaminants (HPLC, GC-MS, LC-MS / MS)
- Microwave mineraliser
- Microwave-assisted extraction in solvent medium
- Controlled temperature and relative humidity chambers

Some publications

- Ponthieu, M. *et al.* Evaluation of the impact of organic matter composition on metal speciation in calcareous soil solution: Comparison of Model VI and NICA-Donnan. *Journal of Geochemical Exploration* 165, 1–7 (2016).
- Sauvadet, M. *et al.* High carbon use efficiency and low priming effect promote soil C stabilization under reduced tillage. *Soil Biology and Biochemistry* 123, 64–73 (2018).
- Smith, R.-M. *et al.* Combining sorption experiments and time of flight secondary ion mass spectrometry to study the co-adsorption of propranolol and copper (II) onto environmental solid matrices. *Science of The Total Environment* 639, 841–851 (2018).

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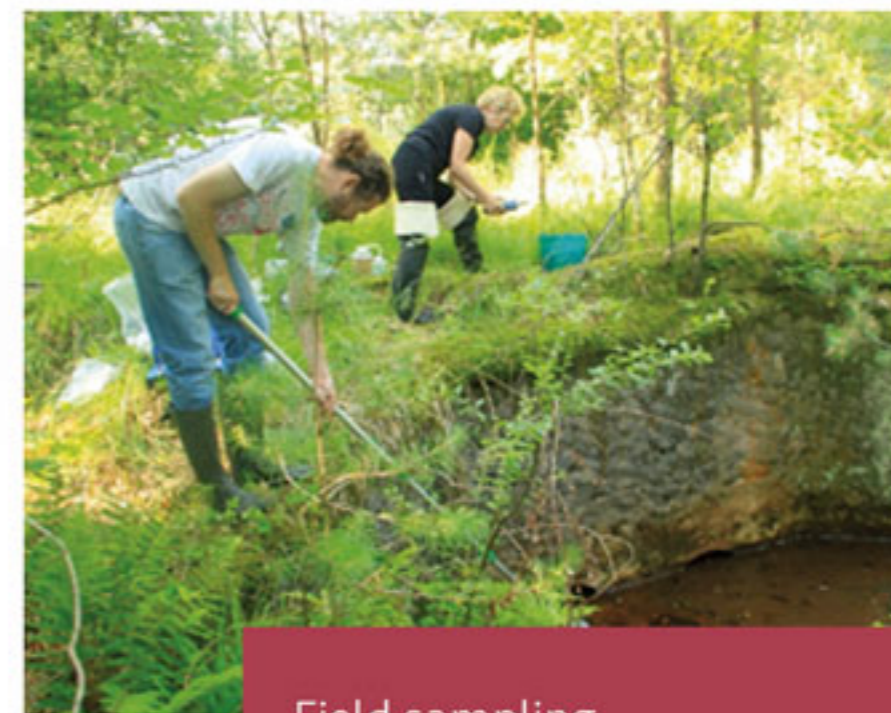
Field sampling

Installation of instrumented plots in the field

Quality training courses

Initial training

Are you looking for future collaborators?
Do you wish to complete your studies?
A wide range of quality training courses provided at URCA focus on soil management.

To find out more: www.univ-reims.fr

Vocational training

Does your structure / company wish to support its employees by training them in soil management?
Our experts can help you.
URCA's vocational training department is ready to meet with you to study your needs and offer you the most appropriate training solution.

To find out more: dfpa@univ-reims.fr