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UMR1418

Microbial Ecology Laboratory (LEM)

Management

Sylvie Nazaret, Director
Florence Wisniewski-Dyé,
Deputy Director

Research topics

- Microbial chemical ecology
- Host-microbiota interactions
- Relationships between microbial diversity and ecosystem functions and services

Key figures

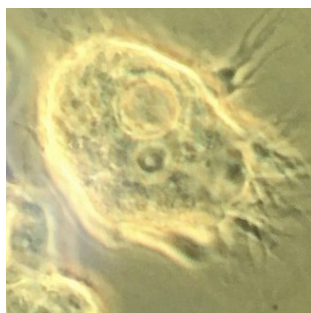
- 41 researchers and equivalent
- 28 engineers and technicians
- 25 PhD students
- 6 post-doctoral students
- 7 research teams

Keywords

- Microbial and chemical ecology
- Host-microbiota interactions
- Symbiosis
- Pathogenesis
- Ecosystems
- Environment

Mission et objectives

The Microbial Ecology Laboratory (LEM) is a research unit (UMR) jointly supervised by INRAE, Université Claude Bernard Lyon 1, CNRS and VetAgro Sup. It combines skills in ecology, microbial ecology, Pasteurian microbiology, metabolomics, (meta)genomics and soil science.



Photos: @INRAE

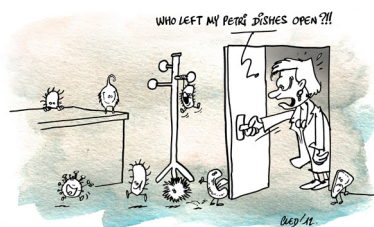
LEM is at the crossroads of microbiology, ecology and environment, and its research focuses on microorganisms:

- Interactions between microorganisms and other organisms;
- Relationship between microorganisms and their environment;
- Adaptation of microorganisms to environmental conditions and to global changes.

Research

Research covers many aspects of microbial ecology ranging from environment to health. The main research topics developed at LEM aim to understand:

- How microorganisms promote plant growth, and can be used in agronomy and (agro-)forestry;
- How the diversity of soil microorganisms contributes to maintaining soil fertility and climate regulation;
- How human activities contribute to the spread of phytopathogenic bacteria, antibiotic-resistant bacteria and "opportunistic" human pathogens, particularly in urban environments;
- How microbial communities respond to anthropic;
- How the microbiota of the tiger mosquito affects its ability to transmit viral diseases.



 Centre
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LEM Teams

- Actinorhizal symbiosis - [SYM](#)
- Rhizosphere - [RHIZO](#)
- Diversity and adaptation of phytopathogenic bacteria - [DABP](#)
- Functional DIVERsity and Nitrogen Cycle - [DIVE-N](#)
- Opportunist Pathogenic Bacteria and Environment - [BPOE](#)
- Microbial Dynamics and Viral Transmission - [DMTV](#)
- Bacterial Efflux and Environmental Resistance - [BEER](#)

Glossary

- AME: Microbial Activities in the Environment
- BIOENVIS: Biodiversité, Eau, Environnement, Ville & Santé
- CESN: Centre d'Etude des Substances Naturelles
- IMU: Intelligence of Urban Worlds
- LBBE: Laboratory of Biometry and Evolutionary Biology
- LEHNA: Laboratory for Ecology of Natural and Man-impacted Hydrosystems
- MAP: Microbiology, Adaptation and Pathogenesis
- OTHU: Field Observatory for Urban Water Management
- PARMIC: Plateforme d'Analyses des Ressources MICrobiologiques
- ZABR: Rhone Basin Long Term Environment Research

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Collaboration and expertise

Locally

LEM is involved in many collaborative projects with laboratories of the BIOENVIS research federation (RiverLy, Reversaal, EVS, MAP, LBBE, LEHNA). It is involved in the activities of OTHU, ZABR, LabEx IMU, EUR H2O'Lyon, Evertéa Foundation (ex-Roaltrain) and InfectioTron. Its research activities are supported by the Rhone Mediterranean Corsica Water Agency and Métropole Grand Lyon. LEM has also developed links with Chambers of Agriculture and Technical Institutes.

Nationally

LEM collaborates with many laboratories, particularly EcoSys, Agroecology, IRHS, EcoBio, Opale, BEF and IAM. National collaborations also involve several private partners (including GreenCell, Dipteratech, Amoeba, BayerCropScience). Finally, LEM is involved in running the Solu-Biod Priority Research Programme and Infrastructure (nature-based solutions).

Internationally

LEM coordinates the H2020 Biodiversa SuppressSOIL projects, the Sino-European EiCLaR project (aiming to improve in-situ bioremediation for the depollution of contaminated soils) and is involved in the H2020 RESTCOAST project. An ERC grant has recently been awarded to a LEM researcher on the topic "Plant and Soil Microbiome Rescue". The unit is also involved in running the international microbial ecotoxicology network, EcotoxicoMic (part of the Evertéa Foundation).

Scientific facilities

LEM has five research technical support facilities, three of which are accessible to academic and private partners:

- AME: aims to characterize microbial enzymatic activities undergoing biotic and abiotic interactions in all types of environments.
- CESN: specializes in chemical ecology applied to biotic and abiotic interactions in the fields of ecology, environment, and health. It enables global metabolomics studies to be carried out as well as purifying and identifying metabolites of interest.
- PARMIC: enables phenotyping and genotyping of bacterial strains.

Teaching

The LEM unit, with 29 lecturer-researchers and some of its PhD students carrying out complementary teaching activities, is heavily involved in teaching and training activities. LEM staff teach about 6,500 hours every year in three higher education establishments: Université Claude Bernard Lyon 1, Institut Universitaire de Technologie Lyon 1 and VetAgro Sup.

LEM staff run or jointly run several courses at Université Claude Bernard Lyon 1:

- Bachelor's degree in Plant Science
- Vocational degree in Industrial Microbiology and Biotechnologies
- Vocational degree in Biodiversity Analysis and Inventory Techniques
- Master's degree in Microbiology in Microbiology / Plant Biology / Medicine and Health Products Science
- Master's degree in Industrial and Urban Risks and Environment



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