



UR1461

PROSE
Environmental biotechnology PRocesses

Environmental biotechnology PRocesses (PROSE)

Management

- Théodore Bouchez, director
- Laurent Mazéas, deputy director

Divisions

- TRANSFORM: Food, bio-products and waste
- MICA: Microbiology and the food chain

Research topics

- Anaerobic digestion
- Wastewater treatment and valorization
- Electromicrobial technologies
- Environmental biorefineries

A few statistics

- 21 permanent staff members
- 9 PhD and post-doctoral fellows
- A shared support team

Our mission

The PROSE unit conducts research on environmental biotechnologies including wastewater treatment and recovery, anaerobic digestion and bioelectrochemical processes for biorefineries. The scale ranges from microbial communities to industrial-scale processes aimed at taking up today's major societal challenges: sustainable development, the circular economy, and bioeconomy. Our transdisciplinary approach combines microbial ecology, biogeochemistry, bioelectrochemistry, bioinformatics, biostatistics, process engineering, physical measurements, and modelling.



Research questions and research strategy

What elementary processes are at work?

We use cutting-edge analytical approaches (metaomics, isotopy) coupled with innovative physical measurement devices to identify and characterize the bio-physico-chemical processes responsible for the transformation of residual organic matter in environmental biotechnology processes.

How do these interacting elementary processes affect the overall performance of the bioprocess?

We are currently developing two strategies: the first involves building a data warehouse and undertaking joint analysis of metadata, physical measurements and metaomic data using data mining approaches. The second is developing mathematical models that combine microbial processes, chemical transformations, and physical phenomena.

Research centre
Île-de-France – Jouy-en-Josas – Antony

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How can our knowledge serve the environment and the bioeconomy?

In collaboration with communities and businesses involved in the field, we provide optimization aimed at improving the performance of wastewater recovery plants and anaerobic digestion of organic waste. We are currently developing innovative bioelectrochemical processes to facilitate the emergence of environmental biorefineries.

Our research capabilities

LABE (Laboratory for research on Bioprocesses for the Environment) is equipped with cutting-edge equipment for **analytical chemistry** (analysers and chromatographs, some coupled to isotopic or high-resolution mass spectrometers) and for **molecular microbiology** (e.g. phase-contrast microscopes and confocal laser scanning microscopes, next generation sequencers, and automated electrophoresis analysers). Our facilities include a hall with a capacity of over 300 m² containing a wide range of **experimental pilots and measuring instruments**.



The team is renowned for its **expertise in the deployment of measurement devices at industrial scale**: e.g. for geophysical measurements using electrical and electromagnetic methods, temperature measurements using optical fiber. The unit deploys state of the art equipment for field measurements of flow rates, the transport of matter (field bubble column, etc.), for gas emission collection and analysis, in-line sensors, and last but not least, a fully-equipped laboratory truck.

