

Scientific research at Gembloux Agro-Bio Tech



SCIENTIFIC RESEARCH

Gembloux Agro-Bio Tech - University of Liège holds a privileged position at the crossroads of research and development, which are at the heart of international and social concerns, thus designating our institution as a leader in sustainable development.

Developing top-level research is one of the priorities of Gembloux Agro-Bio Tech. In order to achieve this, it focuses on bringing together the skills and disciplines needed to meet the needs of its research partners and the challenges of innovation within two research units (TERRA and Agro-Bio Tech), Support Cells for Research and Education (CARE) and different technical platforms.

Such facilities make it possible to develop, at national and international levels, two major skill areas of Gembloux Agro-Bio Tech (ULiège) : “living resources and the environment” and “bioproducts and consumers”.

Gembloux Agro-Bio Tech (ULiège) favours a multidisciplinary and integrative approach within these research fields which are closely linked to sustainable development.



Gembloux Agro-Bio Tech is a faculty of the University of Liège that has existed **since 1860**. In the 2017 academic year, it had:

1378* STUDENTS

41%* FEMALE STUDENTS

32%* FOREIGN STUDENTS

40* NATIONALITIES

337 PHD STUDENTS

499 ACADEMIC, SCIENTIFIC, ADMINISTRATIVE AND TECHNICAL STAFF

307 RESEARCHERS,

including 44 PROFESSORS

61 ASSISTANTS

89 RESEARCHERS PROVIDING ADDITIONAL SERVICES

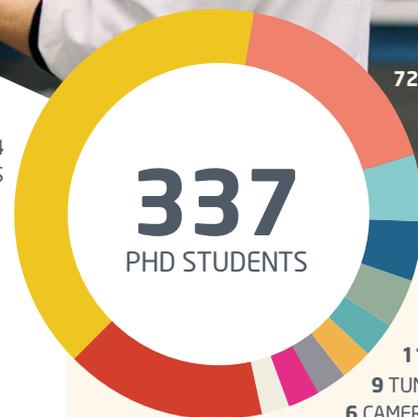
253 RESEARCH PROJECTS

130 HECTARES OF FIELDS AND EXPERIMENTAL FARM,

including 17 HECTARES OF WOODLAND

* for the 2017-2018 academic year

124 BELGIANS



53 PhD students coming from Gabon, Hungary, Laos, Nepal, Philippines, Italy, India...

337
PHD STUDENTS

Origin of PhD students

Gembloux Agro-Bio Tech hosted 337 students during the 2016-2017 academic year, representing more than 39 nationalities.

+ www.gembloux.uliege.be/recherche

ORBi

Open Access platform from the University of Liège

+ <https://orbi.uliege.be>



RESEARCH UNITS

TERRA research unit

Interdisciplinary and interfaculty, TERRA Teaching and Research Centre studies and develops bioscience engineering in the fields of agronomy, agro-businesses, biotechnology, environment and forestry. Its aim is to develop tomorrow's agriculture and forestry by integrating the management of socio-ecological systems and the valorisation of bioproducts.

One of the basic principles of the centre is to stimulate intersection and exchanges between researchers across different disciplines. The interdisciplinary approach fosters national and international scientific collaborations, interactions with the corporate world and interdisciplinary training.

TERRA develops research projects with the faculties of Sciences, Applied Sciences, Medicine, Veterinary Medicine and HEC (management school) of the University of Liège around 9 topics :

1. Monitoring, impact and adaptation to climate change
2. New approaches to crop protection
3. Innovative methods in agricultural production
4. Multi-scale soil-systems
5. Development of agro and urban ecosystems
6. Dynamics and changes in the forest socio-ecological systems
7. Feeding the future
8. Innovative processes in biotechnology
9. Genetic improvement of agrobiological resources

+ www.terra.uliege.be

To support its researchers, TERRA is also developing strategies for research funding and the setting up of international projects, the integration of its platforms into European networks and the development of long-term collaborations with foreign institutions.

Four CARE (Support Cells for Research and Education) are associated with TERRA : Agriculture is life, Environment is life, Food is life and Forest is life.

The four CARE associated with TERRA

The objective of **Agriculture is life** is to validate the relevance of alternative techniques of agricultural production and transformation techniques, from an agronomic, economic, social and environmental viewpoint.

Agriculture is life experiments with new production and processing techniques to develop tomorrow's agriculture while preserving water resources, eliminating the spread of toxic substances in the environment and in food, reducing the dependence of farms on energy, optimising carbon cycles and nitrogen, and providing people with local food resources that are affordable and of high quality.

Through the use of a farm and experimental fields, the strategy implemented by Agriculture is life aims at increasing the value produced by proposing ways of diversifying sampling or production methods, which, jointly, make it possible to maximise beneficial regulating services and reduce the costs.

+ www.agricultureislife.be

The objective of this strategy is to strengthen **Food is life** expertise at Gembloux Agro-Bio Tech - ULiège regarding the valorisation of agresources. The Food is life teams study food engineering and technology, from the raw material to the final product.

In order to seek and support business development, research focuses on the fractionation steps of agresources, purification, processing, fermentation, etc.

As a technology platform, Food is life includes workshops, pilot equipment and analytical laboratories that are supervised by management and research teams.

The pilot equipment is made of equipment related to food production (autoclaves, spray dryer, microfluidizer, granulator fluidised bed dryer, UHT steriliser, centrifuges and high pressure sterilizer) and to fermentation (fermenters of 2 to 2000 litres, a downstream processing area...).

A biophysics laboratory houses additional equipment, including nuclear magnetic resonance, viscometer, blood pressure monitor, film balance, texture analyser, spectrophotometer, farinograph alveograph, infrared analyser, etc. Another laboratory is specifically dedicated to fermentation.

+ www.foodislife.be

Studies done within **Environment is life** focus on the evolution of interactions between water, soil, plants, ecosystems and the atmosphere in relation to environmental factors that cause biotic and abiotic stress.

The effects of climate change on plants are studied (physico-chemical properties of soils, agricultural production, biodiversity, etc.) as well as the interaction plant- atmosphere (both at the levels of the cell, the leaf, the plant and the ecosystem).

THE ECOTRON AND A NETWORK OF TERRESTRIAL OBSERVATORIES (ICOS)

The Ecotron is a unique device in Wallonia (Belgium) where agro-ecosystems implanted on lysimeters can be submitted, all along their growing period, to fully controlled climatic and edaphic conditions. A set of ecosystem variables are also continuously measured to characterise the flow of energy, carbon, water and nutrients. This infrastructure allows researchers to study and model the behaviour of an ecosystem, by modulating specific environmental parameters (e.g. temperature, rainfall, atmosphere).

Environment is life is also part of the European network of terrestrial observatories, ICOS, with which it is possible to study gas exchange between ecosystems and the atmosphere.

+ www.environmentislife.be

Forest is life aims at studying forest ecosystems and, more generally, landscape structures with a low degree of anthropisation, whether it be in temperate or tropical regions.

Research carried out in this CARE is structured according to 4 components :

- the characterization and monitoring of flora and fauna ;
- the dynamics of forest ecosystems ;
- the management and development of forest socio-ecological systems ;
- the development of wood-based natural resources and non-timber forest products.

To carry out this work, the CARE also relies on "observatory" forests (long-term observation and measurement networks on important geographical areas) and "laboratory" forests (more modest surface sites where researchers can interact with management methods and value chains of products derived from these ecosystems).

The CARE Forest is life hosts the very high resolution remote sensing platform that brings together the equipment and the expertise dedicated to the acquisition, processing and analysis of detailed earth observation data to monitor natural areas and agroecosystems.

+ www.forestislife.be



AGRO-BIO TECH research unit

Projects conducted in the Agro-Bio Tech research unit aim at having a better understanding of life in order to improve the production of goods and services for humans.

This faculty research unit enables researchers from Gembloux Agro-Bio Tech to carry out research initiatives and public research programmes in addition to institutional research themes that are being developed in the TERRA research unit.

Projects in the Agro-Bio Tech research unit are intended to :

- characterize biological mechanisms with the objective of understanding living organisms better ;
- improve the production of plant, animal and microbial bioresources to promote sustainability ;
- model and manage industrial processes in the field of sustainable chemistry (green chemistry), agro-food industries and biotechnologies ;
- characterize physicochemical properties and flow in soil-water-plant systems to understand the plant-soil relationship at the landscape scale ;
- characterize the components of natural systems that are likely to be impacted by humans and the evolution of those components with regards to global warming, the growing impact of human pressure, and the ecosystem services that they provide.

Its objectives are to improve the quality of life and the well-being of human and animal populations, while,

at the same time, safeguarding the environment and preserving the development of multifunctional and participatory management models on ecosystems where there was little human impact. Moreover, the project seeks to improve our understanding of biotic and abiotic constraints in highly anthropogenic environments.

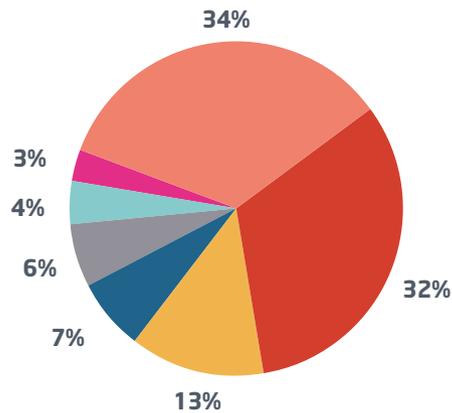
The research activities conducted in the department cover all the objectives of sustainable development set by the United Nations.

+ www.agrobiotech.uliege.be

RESEARCH PROJECTS

FUNDED THESE LAST 5 YEARS (2013-2017)

Funding sources



- WALLONIA-BRUSSELS FEDERATION
- WALLOON REGION
- UNIVERSITY OF LIEGE (INTERNAL FINANCING)
- OTHER
- EUROPEAN UNION
- OTHER - PRIVATE
- FEDERAL STATE

1000 publications per year,

OF WHICH 344 PEER REVIEW ARTICLES

86 CONFERENCES AND CONVENTIONS

391 SCIENTIFIC PAPERS

Top 10 partner countries

-  BELGIUM
-  FRANCE
-  GERMANY
-  MOROCCO
-  DEMOCRATIC REPUBLIC OF CONGO
-  UNITED KINGDOM
-  VIETNAM
-  NETHERLANDS
-  IRELAND
-  ITALY

Number of projects in progress

585

Number of ongoing projects with at least one partner

300

Number of projects by continent





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