



COTE

Continental To coastal Ecosystems: evolution, adaptability and governance





The strength of a university is partly related to its research, meaning the creation of knowledge that it can then pass on and disseminate.

Preparing the future

Higher education and research are key levers in achieving a new form of growth that is smarter, more sustainable and more inclusive, with the goal being to prepare for a knowledge society in which future generations can achieve fulfilment.

The University of Bordeaux and its partners intend to address this challenge by shaping a campus of excellence with an international reputation, uniting its research forces around high-level scientific pillars.

These are neuroscience, medical imaging, cardiology, public health, materials of the future, environment, archaeology, laser optics and digital technologies.

These priorities reflect the research strengths of the Bordeaux site whose excellence is clearly recognised in terms of the standards applicable to the discipline and its high international profile.

Certifications by the French national "Investments for the Future" programme in 2011 have strengthened this dynamic of ambitious multidisciplinary projects. Today, these centres of excellence backed by innovative training offer great prospects for development, French research and the socio-economic world.

The pursuit of excellence is thus at the heart of the development policy of the University of Bordeaux. Through this tremendous momentum, the University of Bordeaux is seeking to answer the challenges of our environment to prepare for tomorrow's society.

Regarding the environment, the objective of the labEx COTE cluster of excellence is to develop tools to understand and predict changes in ecosystems as well as methods of adaptive management and governance to ensure their sustainability.

COTE

The development of human societies is closely linked to the availability and quality of resources and services provided by natural and exploited ecosystems. Ecosystem functioning today is disturbed by the direct and indirect effects of human activity (pollution of the atmosphere and terrestrial and aquatic environments, increase in farmland, depletion of natural resources, etc.).

→ Programme objectives

LabEx COTE has the following scientific objectives:

- > **Identify** the factors responsible for ecosystem evolution.
- > **Create** a conceptual framework to address environmental changes and their impacts on ecosystems.
- > **Develop** tools to predict the evolution of these ecosystems in the medium or long term.
- > **Develop** management methods to maintain the services provided by these ecosystems and preserve their quality.
- > **Strengthen** and **promote** dialogue between researchers, economic stakeholders, civil society and environment managers in Aquitaine.

→ Key figures

- **19** 3-year **research projects** over the entire programme (2012-2019)
- **1** chair of integrative theoretical ecology (with 2 researchers, 2 engineers, and 2 post-doc students)
- **4** new theses and post-docs funded by LabEx COTE every year
- **15 internships** for Masters Students funded by LabEx COTE every year
- **20** COTE mobility **grants** per year for partner research unit doctoral and post-doctoral students who want to work abroad in a laboratory
- **12** COTE mobility **grants** per year for foreign doctoral and post-doctoral students who want to work in one of the partner units for 2 to 6 months
- **1** yearly international summer **school** grouping around 30 doctoral students from all over the world for a week focusing on a general subject relating to eco-system evolution
- **1 stakeholder forum** organised every year intended for the general public on a topical issue and focused on the expertise of LabEx's scientific community

→ Who conducts the LabEx COTE

The governance of the LabEx COTE

> To achieve its goals, the LabEx COTE is managed by:

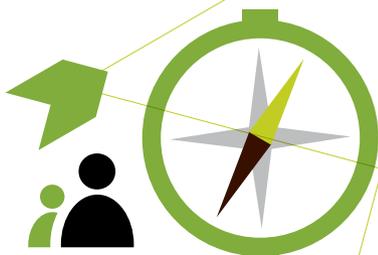


> **A Trustee Committee**
composed of six research and
higher education bodies to
which the laboratories involved
belong.



> **Management Committee** composed of:

- Two co-directors: H el ene Budzinski (Research Director at the CNRS*) and Antoine Kremer (Research Director at the INRA*),
- Two Deputy Directors: Eric Villenave (Professor at the University of Bordeaux) in charge of training, Denis Salles (Research Director at IRSTEA*) in charge of transfer and valorisation.



> **A Steering Committee**
composed of the members of
the Management Committee,
the Directors of the 9 partner units,
and two observer members
(a representative of the Aquitaine
Observatory of Sciences of the
Universe (OASU) and a representative
of EquipEx Xyloforest).

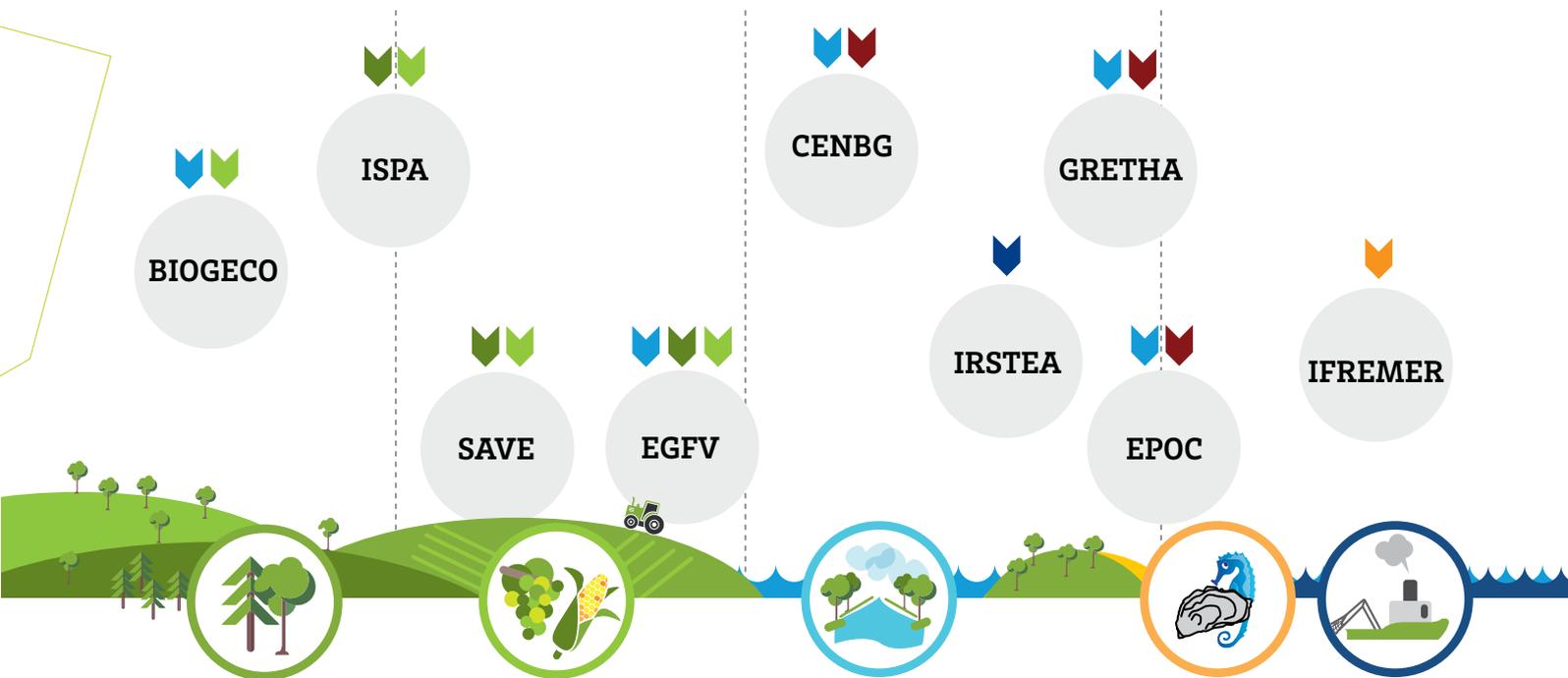


> **A Scientific Committee**
composed of 10 international experts from the various
LabEx COTE disciplines and eco-systems.

* Glossary on the next page

The partner **research units**

The LabEx COTE is comprised of 9 partner research units from 6 different trustees. Their research covers a wide variety of disciplines in the field of environmental sciences.



The trustees  INRA  CNRS  IRSTEA  IFREMER  University of Bordeaux  Bordeaux Sciences Agro

Each research unit may be concerned by other ecosystems than those mentioned on the diagram.

Glossary

CNRS: National Centre for Scientific Research

IFREMER: Research Institute for the Exploitation of the Sea

INRA: National Institute for Agronomic Research

IRSTEA: National Research Institute of Science and Technology for Environment and Agriculture

BIOGECO: BIODiversity, GEnes & COmmunities

CENBG: Bordeaux Gradignan Centre for Nuclear Studies

EGFV: Ecophysiology and Functional Genomics of the Vine

EPOC: Oceanic and Continental Environments and Paleoenvironments

GRETHA: Research Group in Theoretical and applied economics

ISPA: Interactions between Soils Plants and the Atmosphere

SAVE: Vineyard Health and Agroecology



→ Three main areas of study

LabEx COTE studies three types of major European ecosystems using the region of the Aquitaine as an example of an interface area between forests, agro-ecosystems, and hydrosystems. Its aim is to develop research incorporating all the factors responsible for their functioning in view of predicting and controlling their evolution.

Vineyards, cereal and fruit crops, Gironde Estuary, Bay of Arcachon, Aquitaine coast, and the forests of the Landes and the Pyrenees are among the ecosystems studied by LabEx COTE teams.



Photos credits : LabEx COTE



> **Hydrosystems:** preserve the services provided by fragile environments

LabEx researchers are studying continental surface water, coastal ecosystems, such as the Bay of Arcachon and the Gironde Estuary, and marine ecosystems. Their balance and biodiversity are threatened by climate change, chemical pollution, biological invasions, and more broadly global changes (land uses, consumption, etc.).

The challenge is to ensure, beyond good quality aquatic environments, the sustainability of activities such as oyster production or fishing, tourism and recreation, drinking water, agricultural or industrial uses, etc.



> **Agro-ecosystems:** promote the emergence of agriculture models ensuring resource, landscape and biodiversity conservation

Agriculture is a key regional economic activity as it provides consumer products and contributes to regional dynamics. Intensive production methods are also one of the main sources of diffuse pollution of aquatic, land, and atmospheric environments today.

The research challenge is to provide management and development solutions to maintain and increase production quantity and quality levels while ensuring the integrity of the Environment, resources, and environments (soil, water, biodiversity, etc.). In this perspective, LabEx COTE is also studying the emergence of alternative agricultural models to ensure the socio-economic dynamics of regions.



Photos credits : SMEAG/Didier Taillefer - mars 2015



> **Forest Ecosystems:** understand the impact of global change

Forests are currently at the centre of major economic and ecological issues through the services they provide to society: wood and biomass production, biodiversity conservation, carbon storage, fight against erosion, recreation function, landscape, etc. At the same time, their maintenance and sustainability are endangered by the magnitude of the expected climate change and the frequency of extreme events (storms, heat waves, etc.).

Therefore forest **ecosystem management** must respond to new challenges in reconciling often conflicting demands from the forest industry, the energy sector, and society in general.

→ One project, three priorities



> A comprehensive and integrated approach to environmental science

The need for interdisciplinary research

LabEx COTE aims to promote interdisciplinary approaches to ecosystem functioning by combining natural, social, and environmental sciences. It seeks to understand how ecosystems interact with each other in response to global change and socio-economic pressures.

LabEx COTE funds research projects submitted during its annual call for projects that offer these interdisciplinary approaches and study interactions between ecosystems.

The **Chair of Integrative Ecology** features 2 researchers, 2 engineers and 2 post-docs. In the end, it will provide the conceptual framework for the integrative analysis of ecosystems, thanks to the experimental studies currently underway in the Aquitaine region. On the basis of these case studies in progress, it will help develop innovative approaches which *will ultimately* assist public decision-making in terms of adaptive management.



Measuring CO₂ partial pressure in the Leyre's water – CNP Leyre project
© LabEx COTE



Flow of microbial and arthropod species between forest and wine ecosystems FLUX
© INRA Bordeaux project, BIOGECO joint research unit.

- **15 Master 2 research internships** financed every year
- **4 new theses or post-docs** financed every year
- **19 3-year research projects** during the whole program (2012-2019)



> Students sensitised to the complexity of contemporary issues

Training advocating openness and international mobility

The objectives of the LabEx COTE project's training is to develop a culture of interdisciplinarity among students, promote international exchanges related LabEx's activities, and contribute to the professional integration of students taking advantage of ecological transition and green economy opportunities.



Out in Ciron Valley during the summer school 2014 © LabEx COTE

➤ **32 mobility fellowships per year**

➤ **4 new theses or post-docs financed by the LabEx COTE every year**

Every year, the LabEx COTE's summer school opens its doors to around thirty doctoral students and young researchers (French and from other countries) for a week. The curriculum is multidisciplinary and focused on the interactions between ecosystems and global ecology. Case studies and field trips supplement the training. The summer school also allows participants to broaden their knowledge, meet recognised experts in various fields, and establish contacts for future scientific and professional cooperation.



> Shared knowledge

Emphasis on the transfer and use of knowledge produced

The "Transfer & Valorisation" component aims to involve socio-economic stakeholders (policy makers, managers, manufacturers,

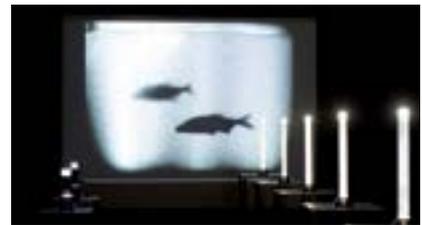
associations, sector professionals, education and training communities, etc.) in research transfer and the valorisation of skills developed by LabEx COTE partner teams.

LabEx COTE promotes projects for "transfer and valorisation" to socio-professional stakeholders and supports scientific mediation actions intended for the general public or schools. It also funds Master internship grants and co-funds "transfer engineer" positions at the interface between a LabEx COTE laboratory and a socio-economic partner (SME, community, manager, association, manufacturer, etc.).

➤ **1 stakeholders' forum per year**

➤ **3 transfer engineer positions co-financed per year**

➤ **10 Master 2 transfer internships per year**

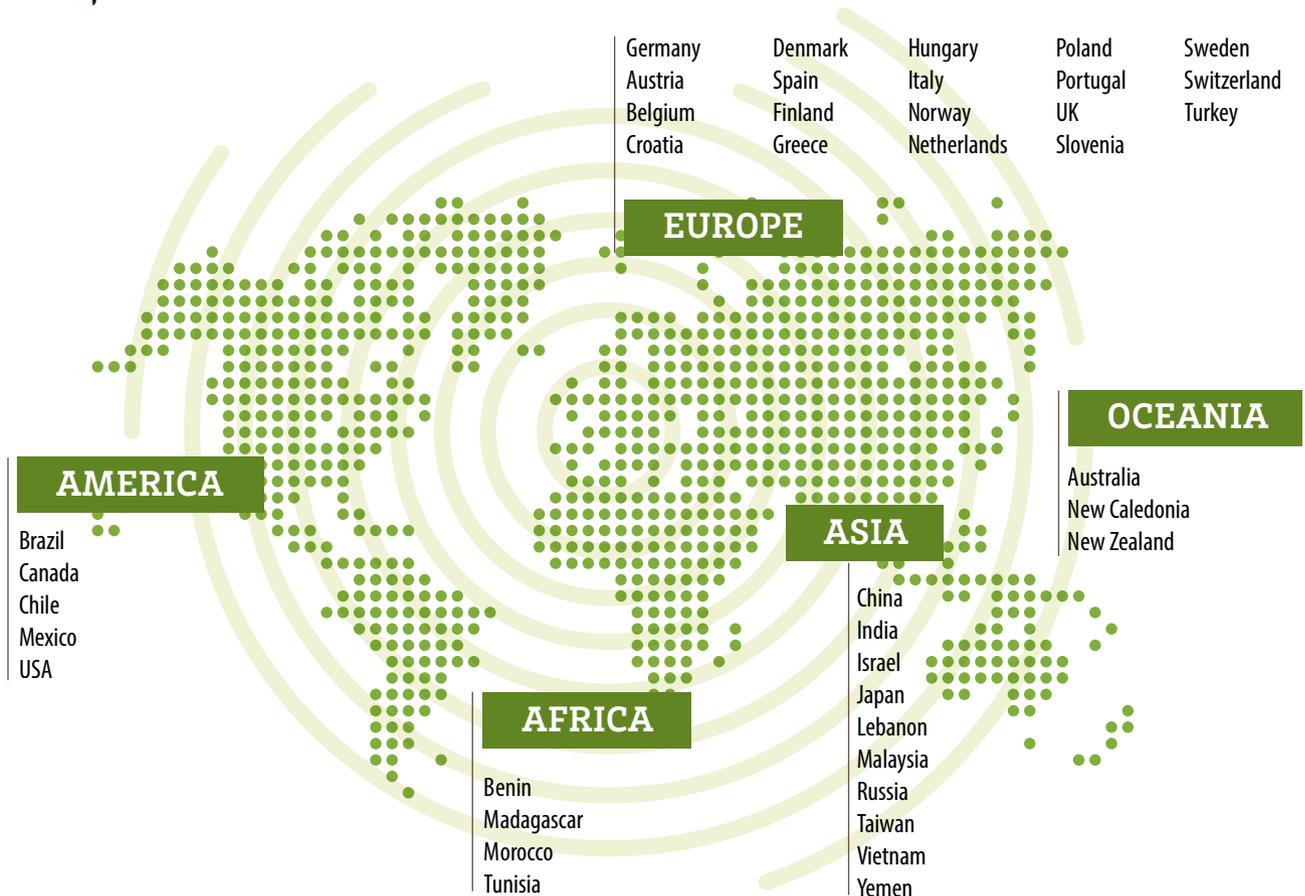


Microscopic poems engraved on eel, flounder, and shad otoliths and tubes containing the related water samples – Travelling exhibition on Protoliths
© Irstea

→ A LabEx opened to the international scene



The LabEx COTE is linked to research laboratories around the world. This international influence is due to the joint efforts implemented by its partner research units but also to the scientific cooperation actions carried out directly in the framework of the LabEx and IdEx Bordeaux.



COTE is also finding opportunities abroad thanks to mobility programs

Fellowships provide support to the doctoral and post-doctoral researchers from the LabEx COTE partner research units wishing to internationalize their studies by spending a few months in a foreign laboratory (outgoing mobility programs). Financial assistance may also be provided to foreign doctoral and post-doctoral researchers coming for a stay (2 to 6 months) in one of the partner units (incoming mobility programs).

➤ 20 **outgoing** mobility fellowships per year

➤ 12 **incoming** mobility fellowships per year

and at the heart of the issues facing society

Stakeholders committee: guaranteeing strong social anchorage

LabEx COTE is supported by a Stakeholders Committee composed of thirty representatives of communities, associations, professional organisations, industry, public bodies, etc. The plurality of the Stakeholders Committee aims to develop new scientific questions and to allow socio-economic stakeholders to express issues in their field. It also aims to be a forum allowing views to be exchanged on the orientation and progress of research.

In support of the Stakeholders Committee, a "forum" is organised once a year in the form of an open seminar favouring sharing and exchanges between all of the stakeholders concerned by the issues studied by COTE.

Resolutely open

LabEx COTE also owes its anchorage in civil society to multiple communication actions aimed at the general public. Knowledge transfer seminars open to all, participation in scientific mediation events (Science Festival, science café, etc.) and contribution to events organised by associations marking LabEx COTE's commitment to sharing knowledge with the greatest number.

In addition to academic productions, COTE activities have a significant role in national and regional media demonstrating its openness and influence.





COTE

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