

## Appendix 1 - CeMEB LabEx research themes

The Mediterranean Centre for Environment and Biodiversity Laboratory of Excellence (CeMEB LabEx - <http://www.labex-cemeb.org/en>) research focuses on the dynamics and functioning of biodiversity and ecosystems in a context of marked environmental change, notably due to human activities. Its activities concern four main themes:

### **Biodiversity patterns: how is biodiversity organized in space and time?**

There is considerable debate surrounding the patterns of biodiversity, and how they are affected by human activities. Even knowledge of taxonomic diversity, the best-known facet of biodiversity, is incomplete and strongly biased toward the species level, megafauna, temperate systems, and components used by people. The spatial and temporal patterns of the various facets of biodiversity (e.g., genetic, taxonomic, functional, trophic) should be documented much further to bridge the current significant knowledge gaps and to address unanswered basic questions.

### **Biodiversity processes: what are the evolutionary and ecological processes that generate and maintain biodiversity?**

Understanding adaptation, diversification and intra/interspecific interactions as key evolutionary and ecological processes shaping biodiversity requires a solid theory-based approach to integrate across organization levels and spatio-temporal scales, and to scale-up from genomes to individuals, ecosystems and global patterns of biodiversity. This will be addressed by exploring genotypes, phenotypes, and their interactions and how they shape the relationships among individual, species and communities.

### **Biodiversity functions: how do the different facets of biodiversity affect ecosystem functions?**

Biodiversity is critical for ecosystem functioning, but pressing questions need to be answered and novel theory has to be developed to understand the scaling of biodiversity effects. It is essential to understand how interactions and variation in abiotic parameters and biological entities turnover scale up to influence relationships between biodiversity and ecosystem functioning, ranging from genes to communities. Combining approaches is required to understand the consequences of variation in horizontal (i.e. within trophic levels) and vertical (i.e. across trophic levels) diversity on ecosystem functioning.

### **Biodiversity and society: how to maintain nature contribution to people for a good quality of life?**

The concept of ecosystem services coined in the early 2000's was recently challenged by IPBES which suggested to move to the concept of 'nature's contributions to people' (NCP) in order to better account for a plurality of perspectives on ecosystems and life quality. The ecology / economy perspective should therefore be enlarged to sociological components and inputs from local practitioners, including indigenous peoples. This unified approach allows tackling at once biodiversity conservation / management and the biological bases of ecosystem services.

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**List of the CeMEB research units :** <http://www.labex-cemeb.org/en/umr>

## Appendix 2 - CESAB

**CESAB** – Centre for the Synthesis and Analysis of Biodiversity – is a key program of the FRB (Foundation for Research on Biodiversity) and aims to implement innovative work to synthesize and analyze already existing data in the field of biodiversity research. Launched in 2010 after the « Grenelle de l'Environnement » by the Ministries for research and for ecology, it was created by eight public research institutions (BRGM, CIRAD, CNRS, IFREMER, INRA, IRD, IRSTEA and MNHN), joined in 2017 by the University of Montpellier.

Researchers can find at CESAB the necessary means and infrastructure to share and enhance existing information, and to conduct analyses that address major scientific challenges in biodiversity research. Advancing knowledge, developing synthesis research and collaboration, facilitating the links between all scientific disciplines: these are the main assets of CESAB which hosts a large number of researchers every year from all the continents, during work sessions spread over the project timeline.

For many years, teams of researchers have been collecting, producing and analyzing more and more data on biodiversity. The information acquired today provides undeniable and essential knowledge and allows us to better understand the contributions that biodiversity can provide for humanity. And it is possible to go even further: assembled and combined, existing data, ideas and concepts can generate new advances in both pure and applied research. Together, these existing data can supply new issues and significantly advance our biodiversity knowledge.

Nicolas Mouquet is scientific director of the CESAB since 2019.

**List of the CESAB groups :**

<https://www.fondationbiodiversite.fr/en/the-frb-in-action/programs-and-projects/le-cesab/>

**CESAB publications list :**

<https://www.fondationbiodiversite.fr/en/cesab-scientific-publications/>

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