Catalogue

Marine Research Infrastructure 2015

Colophon

The Catalogue 'Marine research infrastructure' is a derived product of the Compendium for Coast and Sea: An integrated knowledge document on the socio-economic, ecological and institutional aspects of the coast and sea in Flanders and Belgium. The Compendium is the result of a collaboration between numerous research groups, administrations, societal organisations and consultation platforms with regard to the coast and sea. This initiative is coordinated by the Flanders Marine Institute (VLIZ).

The Compendium for Coast and Sea can be consulted online: www.compendiumkustenzee.be.

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VLIZ

COMPENDIUM
KUST & ZEE / COAST & SEA

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Université Catholique de Louvain (UCL)

University of Mons (UMons)

University of Namur (UNamur)

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Readers guide

The Catalogue 'Marine Research Infrastructure' discloses the research infrastructure (RI) that is available in the Belgian marine research groups (MRGs), affiliated to universities, graduate schools and scientific institutes. The goal of this publication is to demonstrate the (technical) expertise of the research groups, stimulate collaboration and optimise the use of the available RI. Furthermore, this publication can be used as an input for international, European and national marine science policy and mapping initiatives.

The MRGs are mapped in the framework of the Compendium for Coast and Sea, using a specific methodology where each group has to comply with a number of criteria (see Chapter 1 - Marine Research of the Compendium for Coast and Sea). For this catalogue, a first screening of the RI of the MRGs was performed by the secretariat of the Compendium for Coast and Sea. The draft information sheets were subsequently sent out to each of the research groups for validation. A number of MRGs that reported no RI are not included in this publication.

A framework with two levels of hierarchy was developed in order to report the available RI in a standardised way. This framework was developed in consultation with experts and taking into account relevant (European) initiatives such as:

- European portal on research infrastructures' services
- Seasera-project – work package 4: Infrastructures
- MarinEra-project
- Mapping of the European Research Infrastructure Landscape: MERIL database
- Eurocean marine infrastructure database
- Expert group on marine RI (EC)
- European Strategy Forum on Research Infrastructures (ESFRI)

For each first-level category, a symbol was developed in order to allow a quick screening of the available types of RI in the different MRGs (see table). For the category 'Experimental facilities and analysis capacity', additional symbols are used to create a more uniform terminology.

Whenever available, the website and contact person with regard to the RI are mentioned. Furthermore, the IMIS-ID of the research groups is visualised in the upper right corner of every MRG-sheet. The IMIS-ID is a numeric code referring to the webpage of the MRG within the VLIZ Integrated Marine Information System (IMIS) and corresponds to the digits at the end of the URL of the webpage (http://www.vliz.be/imis/imis.php?module=institute&insid=ID). In the IMIS-database additional information about the MRG can be consulted, such as the current staff, an overview of the publications affiliated to the MRG, projects in which the group participated and datasets (where relevant).

Contributions, improvements and corrections with regard to this publication can be sent to the secretariat of the Compendium for Coast and Sea (compendium@vliz.be).

The catalogue is accessible in an interactive way on the VLIZ-website (www.vliz.be) and the website of the Compendium for Coast and Sea (www.compendiumkustenzee.be).

Infrastructure Categories				
Level 1 category		Level 2 category		
	Research Vessel			
	Marine and coastal stations			
	Sampling, observation and (sea-going) survey infrastructure	Underwater vehicles, drifters and floats		
		Ship-based instrumentation		
		Fixed platforms, moorings and landers		
		Field instrumentation		
	Satellites & (airborne) remote sensing capacity			
	Experimental facilities and analysis capacity	Overview		Particle size analysis
				X-ray diffractometer
				Analysis of genetic material
				Chromatography
				Mass spectrometers
				Microscopes
				Aquaculture experimental facilities
				Marine land-based facilities for engineering
		Type of laboratory / analyses		
		Class or accreditation of lab		
		Analysis equipment, services and techniques		
		Aquaculture experimental facilities		
		Marine land-based facilities for engineering		
		Other experimental facilities and analysis capacity		
	Data & information management and computing infrastructure	Numerical models, specialised software packages and computational infrastructures		
		Simulators		
		(Marine) libraries		
		Marine data centres		
		Collections		
	Logistics			

Overview Marine Research Infrastructure

In the table below, an overview is given of the research infrastructure (RI) which is available in the marine research groups (MRGs). This overview is based on the information which was collected in fact sheets by the secretariat of the Compendium for Coast and Sea. Most of these fact sheets were validated by the research groups (80 out of 110 fact sheets were validated). For a number of MRGs information about the RI was lacking and is thus not included in this overview.


Research Vessel


Marine & Coastal station


Sampling, observation & survey infrastructure


Satellites & (airborne) remote sensing capacity

Infrastructure Categories		Infrastructure
		• 2 regional vessels (35-55 m) • 4 RIBs • 3 smaller boats
		3 marine and coastal stations: at the Belgian coast, in Corsica and in Madagascar
	Underwater vehicles, drifters and floats	• 1 Autonomous Underwater Vehicle (AUV) • 1 unmanned surface vessel • 3 Remotely Operated Vehicles (ROVs) (2 mini ROVs and ROV Genesis)
	Ship-based instrumentation	14 MRGs indicate to dispose of ship-based instrumentation. It mostly concerns instruments to sample and analyze the water column, sediments and marine organisms. Several groups have devices to measure the direction and strength of sea currents. Furthermore, 4-5 MRGs have acoustic devices to map and characterise the (sub-)seabed. One group disposes of a container lab which can be placed on a ship.
	Fixed platforms, moorings and landers	• 4 MRGs indicate to have frames (tripods) for mounting oceanographic instruments • 1 buoy • 1 mooring
	Field instrumentation	21 MRGs indicate to dispose of field instrumentation. This covers a plethora of instruments ranging from devices to record waves and tides, acoustic receiver networks to meteorological stations.
		• 1 airplane • Several remotely piloted aircraft systems (RPAS) (fixed wing cruiser & octocopters) • Several instruments (e.g. APEX & LiCrIS) and platforms for remote sensing (e.g. PROBA-V satellite) • Several MRGs (2-3) have the capacity to access and process satellite-imagery
	Overview	PSA XRD CHR MS
	Type of laboratory / analyses	63 MRGs indicate to dispose of a laboratory, analysis equipment or perform certain services and techniques (see also other section on analysis equipment, services and techniques).
	Class or accreditation of lab	14 MRGs indicate to dispose of laboratories with some kind of accreditation.
	Analysis equipment, services and techniques	The MRGs dispose of a plethora of analytical instruments and techniques. Some more specific numbers are given below: • At least 8 MRGs dispose of devices for particle size analysis • At least 3 X-ray diffractometers • At least 20 MRGs dispose of instruments and techniques for the analysis of genetic material • At least 26 gas chromatography setups • At least 20 liquid chromatography setups • At least 33 mass spectrometers • At least 14 electron microscopes (SEM/TEM) • At least 4 CT-scanners

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Logistics

Infrastructure Categories		Infrastructure
	Aquaculture experimental facilities	18 MRGs indicate to dispose of aquaculture experimental facilities. These facilities range from small tanks in temperature controlled cabinets, raceway ponds, photobioreactors, to tanks of several thousand litres with recirculation systems and extensive outdoor aquaculture facilities.
	Marine land-based facilities for engineering	10 MRGs indicate to dispose of marine land-based facilities for engineering: • 3 towing tanks • 10 wave & current flumes • 2 wind tunnels • 2 wave & test basins
	Numerical models, specialised software packages and computational infrastructures	34 MRGs indicate to dispose of numerical models, specialised software packages and computational infrastructure.
	Simulators	4 MRGs indicate to dispose of (marine) simulators: • 6 simulators relate to shipping and maritime transport • 1 simulator relates to fishing gear
	(Marine) libraries	16 MRGs indicate to dispose of a (partly marine) library.
	Marine data centres	15 MRGs indicate to dispose of a (partly) marine data centre. It mainly concerns biological databases and datasystems, although there are also databases with a geological, chemical, historical, socio-economic and geographical objective.
	Collections (e.g. for biological resources)	17 MRGs indicate to dispose of a collection which is of relevance for marine research. It mainly concerns biological collections (13 MRGs), followed by geological collections (4 MRGs), 1 collection with regard to heritage and 1 historical collection.
		This section contains a wide range of items. It *inter alia* concerns: • Several cold rooms and freezers • Two sediment core repositories • Meeting facilities • Vans and four wheel drives • Diving equipment

European Strategy Forum for Research Infrastructures (ESFRI)

The development of new or upgrading of existing supermassive research infrastructure of pan-European importance is one of the basic pillars of the current policy of the European Commission on the further development of the European Research and Innovation Area. It is research infrastructure that is considered to be crucial for further developments within a research field. To this end, a transparent and global vision of European needs has been developed in the form of a roadmap for research infrastructure in Europe for the next 10 to 20 years. The elaboration of this scientific roadmap has been entrusted to the 'European Strategy Forum on Research Infrastructures' (ESFRI). The first version of the ESFRI-roadmap has been published in 2006, followed by several updates. From 2010 onwards, several projects from this roadmap have moved from the preparation to the implementation phase.

The contribution of Flanders in a number of these pan-European research infrastructures is managed by the Hercules Foundation. Currently, Flanders is participating in three ESFRI-infrastructures with a specific marine component: LifeWatch (biodiversity research), Integrated Carbon Observation System (ICOS) and European Marine Biological Resource Centre (EMBRC). Hence, the marine scientific community can use the services and facilities provided by these infrastructures. In the following pages, the services and facilities of LifeWatch, ICOS and EMBRC are elaborated.

European Marine Biological Resource Centre (EMBRC)


Research Vessel


Marine & Coastal station


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

// Abstract

EMBRC (http://www.embrc.eu/) is a coordinating research infrastructure providing access to marine biological resources and consists of state-of-the-art research facilities and training at marine research stations throughout Europe. This includes marine biological species (models), biobanks, 'omics' platforms, structural facilities and imaging (microscopy, cytometry, etc.).

The Flemish contribution to EMBRC is coordinated by Ghent University in collaboration with the University of Hasselt and Flanders Marine Institute (VLIZ).

Infrastructure Categories		Infrastructure
		RV Simon Stevin will be deployed in the framework of EMBRC
		Marine Station Ostend (VLIZ) (http://www.vliz.be/en/marine-station-ostend)
	Underwater vehicles, drifters and floats	ROV Genesis (VLIZ)
	Ship-based instrumentation	Various sampling tools
	Overview	
	Type of laboratory / analyses	Technology platforms: • Aquarium and Culture platforms • Imaging and Microscopy platforms • Omics platforms
	Marine data centres	• The European Marine Training Portal (http://www.marinetraining.eu/) • EMBRC aims to establish a common e-infrastructure for processing, curating, analyzing and storing marine data
	Collections	Culture collections (***inter alia*** available at Ghent University)

Integrated Carbon Observation System (ICOS)


Research Vessel


Sampling, observation & survey infrastructure

// Abstract

ICOS (http://www.icos-infrastructure.eu) is a European monitoring network consisting of a large number of observation systems for measuring greenhouse gases. The observation systems are spread across Europe and consist of three major components: an atmospheric component with high measurement towers, an ecosystem component with measurement towers that observe fluxes and a marine component with observation systems on ships and buoys. Through these observation systems, ICOS aims to provide long-term data required to better understand the current situation as well as the future behaviour of the global carbon cycle and greenhouse gas emissions. These data will also shed light on the factors that control the changing atmospheric composition in greenhouse gases.

In Belgium the ecosystem component is monitored by the University of Antwerp (Plant and Vegetation Ecology research group) and the Research Institute for Nature and Forest (INBO). Flanders Marine Institute (VLIZ) and the University of Liège (Unit of Biosystem Physics) take care of the marine component.

Infrastructure Categories		Infrastructure
		Deployment of RV Simon Stevin in the framework of ICOS.
	Ship-based instrumentation	• pCO_2 sensor • CTD has been expanded with sensors for measuring the acidity and photosynthetically active radiation
	Fixed platforms, moorings and landers	A buoy nearby the C-power wind park with ***inter alia*** a CTD for continuous measurement of the temperature and salinity supplemented with sensors for measuring the turbidity, the dissolved oxygen concentration, seawater pH, chlorophyll-a concentration, dissolved nutrients, currents and CO_2-concentration in air and seawater

LifeWatch


Research Vessel


Sampling, observation & survey infrastructure


Satellites & (airborne) remote sensing capacity


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

// Abstract

LifeWatch (http://www.lifewatch.be (regional portal) / http://www.lifewatch.eu (central portal)) is a European infrastructure for biodiversity research. It is a virtual laboratory consisting of observation stations, databases, web services and modelling tools installed across Europe. This network facilitates the generation, processing, integration and analysis of biodiversity data.

The Flemish contribution to the European LifeWatch infrastructure is coordinated by Flanders Marine Institute (VLIZ) as far as the marine scientific section is concerned and by the Research Institute for Nature and Forest (INBO) as far as the fresh water and terrestrial section is concerned. The Flemish LifeWatch consortium is funded through the Hercules Foundation. Furthermore, the Royal Belgian Institute of Natural Sciences (RBINS), the Belgian Biodiversity Platform, the Earth and Life Institute (UCL) and the Biosystems Engineering Department (ULg / Gembloux-ABT) are involved as Belgian partners.

Infrastructure Categories		Infrastructure
		Monthly monitoring campaigns with the research vessel Simon Stevin (http://www.lifewatch.be/en/simon-stevin): A grid of nine stations is orientated along an east-west gradient and covers the coastal zone. These stations are sampled monthly. Seasonally, eight additional stations, located further at sea, are sampled according to an offshore-inshore gradient. A list of measured parameters: • zooplankton • phytoplankton • depth profile of the water column: temperature, salinity, turbidity, oxygen concentration, light scatter and acidity • water sample: nitrate and phosphate concentration, chlorophyll-a and other pigments and suspended particulate matter • Secchi depth • macrobenthos • bottom sample: grain size
	Ship-based instrumentation	• Flow cytometer (http://www.lifewatch.be/en/flow-cytometer) • Video Plankton Recorder (VPR) (http://www.lifewatch.be/en/video-plankton-recorder)
	Field instrumentation	• Fish acoustic receiver network in the Belgian part of the North Sea (http://www.lifewatch.be/en/fish-acoustic-receiver-network) • GPS tracking network for large birds (herring gulls, lesser black-backed gulls and marsh harriers) (http://www.lifewatch.be/en/gps-tracking-network-large-birds) • Sensor network for bat detection (http://www.lifewatch.be/en/sensor-network-bat-detection) • Groundwater monitoring (http://www.lifewatch.be/en/groundwater-monitoring)
		• Space remote sensing sensors (http://www.lifewatch.be/en/space-remote-sensing-sensors) • Aerial remote sensing sensor (http://www.lifewatch.be/en/aerial-remote-sensing-sensor) • Unmanned Aerial System (UAS) (http://www.lifewatch.be/en/unmanned-aerial-system)
	Analysis equipment, services and techniques	• Zooscan (http://www.lifewatch.be/en/zooscan)
	Marine data centres	• Construction of a central taxonomic backbone, which facilitates the standardisation of species information and the integration of the different biodiversity facilities. • VLIZ and INBO manage numerous databases that make a significant contribution to biodiversity research in Flanders (EurOBIS, EMODnet, Marine Regions, Broedvogel, Florabank, VIS, Vlinder, Watervogels, Wildbeheer). These databases are further completed and integrated in the central LifeWatch infrastructure. • The development of online web services, models and applications so as to disclose all available data as well as the taxonomic backbone.

Flemish University Associations

// Antwerp University Association (AUHA)
// Ghent University (UGent)
// KU Leuven University (KU Leuven)
// Vrije Universiteit Brussel (VUB)

Antwerp University Association

// Faculty of Science

- Research group Functional Morphology
- Research group Systemic Physiological and Ecotoxicological Research

// Faculty of Pharmaceutical, Biomedical and Veterinary Sciences

- Toxicological Centre

// Faculty of Arts and Philosophy

- Centre for Urban History

// Faculty of Applied Economic Sciences

- Department of Transport and Regional Economy

// Other

- Antwerp Maritime Academy

Research group **Functional Morphology** (UAntwerpen)

// Website research infrastructure

http://www.ua.ac.be/main.aspx?c=.FUNMORPH&n=70331


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	Field portable equipment (race-track, high-speed camera, force plate, bite force transducers, etc.)
	Type of laboratory / analyses	The research group investigates the evolution of functional systems, for which it uses a wide range of equipment to quantify motion and function in animals.
	Analysis equipment, services and techniques	• Vicon infrared system (automated motion capture system) • High-speed cineradiography system • Electromyography (emg)-system (study of muscle activity patterns) • Force plate to measure ground-reaction forces in a wide array of animals • Treadmill to measure lizard locomotor endurance • Integrated zoo set-up to study the kinesiology of ape locomotion • 3D laser scanner and 3D coordinate measurement system • A portable spectrometer (Avaspec-2048-USB2-UA-50, Avantes) to quantify colours
	Numerical models, specialised software packages and computational infrastructures	ANSYS - Academic Research simulation software for computational biomechanical models

Functional Morphology

Universiteitsplein 1, Campus Drie Eiken, Building C, 1th floor
B-2610 Antwerp

Research group **Systemic Physiological and Ecotoxicological Research** (UAntwerpen)*

// Website research infrastructure

http://www.sphere.be/technology

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	A range of analytical techniques: full transcriptomics, proteomics and metabolomics platforms, flow cytometry, enzymology, a broad range of organic and inorganic chemical analyses.
	Analysis equipment, services and techniques	• Stratagene Q RT PCR (Real-Time PCR) • Microbeta Tri Lux (multi-detector instrument for liquid scintillation or luminescence detection of samples) • Coulter Counter • Lightcycler • High Resolution Inductively Coupled Plasma Mass Spectrometry (HR-ICP-MS) • Biohazard Flow Bench • Array Spotter • Microwave destruction • Gamma Counter • Biacore System • Inductively Coupled Plasma Mass Spectrometry (ICP-MS) • Total Organic Carbon • Potentiometer • Flow Cytometer • Micro Balance • Zebrafish Tanks • Agilent Tof Mass Spectrometer (MS) 0 • Cel Potentiometer • Laser Ablation Microscope • Blood gas analysers
	Aquaculture experimental facilities	There are model systems for a range of organisms including tilapia, juvenile carp, zebra fish, green algae, ***Daphnia***, ***Escherichia coli***, harbour porpoises, etc.

***Content not validated by the research group**

SPHERE

Groenenbrogerlaan 171/U7
B-2020 Antwerp

Toxicological Centre (UAntwerpen)*

// Website research infrastructure

https://www.uantwerpen.be/en/rg/tox/facilities-and-collaboration/analytical-service/

Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Type of laboratory / analyses	Forensic Toxicology and Environmental Toxicology
	Analysis equipment, services and techniques	With regard to marine research the following analytical services are of particular relevance: • POPs and BFRs in human, environmental (dust, sediment, soil) and biological matrices (tissues, eggs, food) • Organophosphate flame retardants in abiotic (sediment and dust) and fish oil samples

*Content not validated by the research group

Toxicological Centre

Campus Drie Eiken
Universiteitsplein 1
B-2610 Antwerp

Centre for **Urban History** (UAntwerpen)

// Website research infrastructure

https://www.uantwerpen.be/en/projects/gistorical-antwerp/

// Contact research infrastructure

Prof. dr. Tim Soens (tim.soens@uantwerpen.be)

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Marine data centres	GISTorical Antwerp: GIS-infrastructure linking urban history to the history of the natural environment (including the Scheldt Estuary).

Urban History

Prinsstraat 13
B-2000 Antwerp

Department of **Transport and Regional Economics** (UAntwerpen)

// Website research infrastructure

www.uantwerp.be/tpr

// Contact research infrastructure

Prof. dr. Ann Verhetsel (ann.verhetsel@uantwerp.be)
dr. Thierry Vanelslander (thierry.vanelslander@uantwerp.be)

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Numerical models, specialised software packages and computational infrastructures	• Maritime chain cost simulation model • Maritime Business Game
	(Marine) libraries	https://www.uantwerpen.be/en/library/
	Marine data centres	www.steunpuntmobilo.be

TPR

Prinsstraat 13
B-2000 Antwerp

Antwerp Maritime Academy (AUHA)

// Website research group

http://www.hzs.be/

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Simulators	• Full Mission Bridge Simulator • Propulsion Plant Training (PPT) • Global Maritime Distress and Safety System (GMDSS) • Dynamic Positioning
	(Marine) libraries	HZS library (http://www.hzs.be/en/student-facilities/library)

Antwerp Maritime Academy

Noordkasteel Oost 6
B-2030 Antwerp

Ghent University

// Faculty of Sciences

- Laboratory for Applied Geology and Hydrogeology
- Research group Evolutionary Developmental Biology
- Research group Evolutionary Morphology of Vertebrates
- Geomatics
- Marine Biology research group
- Laboratory of Microbiology
- Nematology research unit
- Research unit Palaeontology
- Phycology research group
- Laboratory of Protistology and Aquatic Ecology
- Renard Centre of Marine Geology

// Faculty of Engineering and Architecture

- Center for Mobility and Spatial Planning
- Coastal Engineering, Bridges and Roads unit
- Hydraulics laboratory
- Magnel laboratory
- Maritime Technology division
- Department of Materials Science and Engineering
- Soete laboratory

// Faculty of Bioscience Engineering

- Laboratory of Aquaculture and Artemia Reference Center
- Laboratory of Environmental Toxicology and Aquatic Ecology
- Laboratory of Food Microbiology and Food Preservation
- Laboratory for Microbial Ecology and Technology
- Research group on Soil Spatial Inventory Techniques

// Faculty of Veterinary Medicine

- Laboratory for Chemical Analysis
- Department of Morphology

// Faculty of Medicine and Health Sciences

- Department of Movement and Sport Sciences

// Faculty of Arts and Philosophy

- Department of Archaeology

Laboratory for **Applied Geology and Hydrogeology** (UGent)

// Website research group

http://www.earthweb.ugent.be/index.php?/public/nl_research/ltgh


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	• Hydrogeological field infrastructure (groundwater level measurements, pumping tests, groundwater sampling) • Geophysical field infrastructure: geo-electrical prospection (1D VES and profiling; 2D tomography); geophysical borehole measurements
	Type of laboratory / analyses	Laboratory for chemical water analyses
	Numerical models, specialised software packages and computational infrastructures	Groundwater modelling software

Applied Geology and Hydrogeology

Krijgslaan 281, S8/WE13
B-9000 Ghent

Research group **Evolutionary Developmental Biology** (UGent)

// Website research group

http://www.evodevo.ugent.be

Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	• Histology lab • Molecular biology lab
	Analysis equipment, services and techniques	• High resolution light and fluorescence microscopes • Access to transmission and scanning electron microscopes • Confocal laser scanning microscope • Equipment for conventional histology (incubators, microtomes, etc.) • (Immuno)histochemistry • *In vitro* organ culture • *In situ* hybridisation
	Aquaculture experimental facilities	Aquaria for freshwater fish

Evodevo

K.L. Ledeganckstraat 35
B-9000 Ghent

Research group **Evolutionary Morphology of Vertebrates** (UGent)

// Website research infrastructure

http://www.fun-morph.ugent.be/?q=node/46

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	• Clearing and staining • Histology • Graphical three dimensional reconstructions • Morphometrics • Phylogeny and systematics
	Analysis equipment, services and techniques	• Rotational microtomes (e.g. MICROM HM360) • Sliding microtome (e.g. POLYCUT Leica SM2500) • Digital camera (Colorview 8, Soft Imaging System), mounted on a stereomicroscope (WILD M5) • Equipment for Molecular phylogenetic analyses: - Extraction of DNA (PuregeneTM DNA isolation kit, type D-5000A) - PCR amplification (Progene Thermal Cycler (Techne)) - Sequencing of the used fragments (BigDye technology) - Alignment of the genes and spacers (automatically aligned in CLUSTALW 1.64b and optimised in Genedoc 2.6.002) - Phylogenetic reconstruction (analysis using programmes: MrBayes, PAUP* 4.0b8 and POY)
	Numerical models, specialised software packages and computational infrastructures	• 3D reconstruction software (e.g. Amira and Rhinoceros software) • Image processing software (Analysis Docu - Soft Imaging System GmbH, version 3.0) • Landmark configuration
	Marine data centres	Catalogue of specimens in the collection of the Laboratory for Evolutionary Morphology of Vertebrates (http://www.evomorph-specimens.ugent.be/)

Evolutionary Morphology of Vertebrates

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B-9000 Ghent

Geomatics (UGent)*

// Website research group

http://geoweb.ugent.be/


Sampling, observation & survey infrastructure


Satellites & (airborne) remote sensing capacity


Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Field instrumentation	A range of topographical and photogrammetrical instruments (leveling instruments, robotic total stations, digital cameras for terrestrial photogrammetry, different GNSS receivers, terrestrial laser scanners, mobile mapping, etc.)
		Processing of satellite images and aerial recordings from different types of moving platforms
	Type of laboratory / analyses	Laboratory for lens calibrations and calibrations of total stations
	Analysis equipment, services and techniques	• Collimator • Laser interferometer

*Content not validated by the research group

Geomatics

Krijgslaan 281, S8/WE12
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Marine Biology research group (UGent)

// Website research group

http://www.marinebiology.ugent.be/


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Ship-based instrumentation	Reineck boxcorer, hyperbenthic sledge, Van Veen grabs
	Field instrumentation	Acoustic receivers
	Overview	
	Type of laboratory / analyses	• Chemical lab • Molecular lab • Sedimentological lab
	Analysis equipment, services and techniques	• Light microscopy including image analysis software (Nikon Elements & Leica Application Suite) • Chemical lab (HPLC, GC-MS, GC-FID, Skalar nutrient chain, Victor multilabel reader, Beckman Coulter counter, etc.) • Molecular Lab (PCR, qPCR, DGGE, Qubit & nanodrop, etc.) • Sediment grain size analysis by laser diffraction, sediment organic matter analysis and characterisation • Microrespiration equipment (polarographic electrodes, optodes, etc.)
	Aquaculture experimental facilities	• Aquaria and climate rooms, experimental rooms • Ocean acidification facilities • Microcosms facilities for rearing and experimental manipulation of benthic invertebrates
	Marine data centres	A generic online species information system: NeMys (a digital platform, storing all kinds of information for biological taxa)

MARBIOL

Krijgslaan 281, building S8
B-9000 Ghent

Laboratory of **Microbiology** (UGent)

// Website research infrastructure

http://lmg.ugent.be/?q=all-infrastructure

// Contact research infrastructure

Anne.willems@ugent.be

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	CHR MS
	Type of laboratory / analyses	Microbiological laboratory: • Taxonomic characterisation of pure cultures • Molecular analysis of natural ecosystems • Culture-independent detection and enumeration of specific bacterial groups in complex sample matrices
	Class or accreditation	Biosafety level 2 and 3
	Analysis equipment, services and techniques	*Methods and techniques:* • Genotypic techniques (i.e., sequence analysis of various genes, a range of species- or strain-specific DNA fingerprinting methods, and DNA-DNA hybridisations) • Chemotaxonomic methods (i.e. analysis of whole-cell fatty acids and polar lipids, and MALDI-TOF and electrospray mass spectrometry) • Phenotypic characterisation • Gradient Gel Electrophoresis (DGGE) • MALDI-TOF and electrospray mass spectrometry • Real-time PCR protocols • Expertise in computerised data handling and database construction *Instruments:* • SpectraMax Plus384 Spectrophotometer • 3130xl Genetic Analyzer • High-Performance Liquid Chromatography (HPLC) • Colony Picker K2 • Compac GC for N and C-cycle research • GC for FAME analysis
	Collections	Public BCCM/LMG Bacteria Collection, closed Research Collection

Microbiology

K. L. Ledeganckstraat 35
B-9000 Ghent

Nematology research unit (UGent)

// Website research group

http://www.ugent.be/we/biology/en/research/nematology

// Contact research infrastructure

Wim Bert (wim.bert@UGent.be)

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Nematology laboratory
	Analysis equipment, services and techniques	• Transmission Electron Microscopy (TEM) • Scanning Electron Microscopy (SEM, JEOL JSM-840) • Video Capture and Editing microscopy
	Collections	Nematode slide collection UGent and voucher specimens

Nematology

K.L. Ledeganckstraat 35
B-9000 Ghent

Research unit **Palaeontology** (UGent)

// Website research group

http://www.paleo.ugent.be/

// Contact research infrastructure

Prof. dr. Stephen Louwye (stephen.louwye@ugent.be)

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Paleontological lab
	Analysis equipment, services and techniques	• JEOL 6400 scanning electron microscope • 2 Zeiss AxioImager 1.A light microscopes + AxioCam MRc5 digital camera • Zeiss Axioskop2 light microscope + AxioCam MRc5 digital camera • Several high-end binocular microscopes

Palaeontology

Krijgslaan 281, S8 / WE13
B-9000 Ghent

Phycology research group (UGent)

// Website research group

http://www.phycology.ugent.be/

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Molecular laboratory
	Analysis equipment, services and techniques	Microscopy
	Aquaculture experimental facilities	Temperature controlled cabinets
	Numerical models, specialised software packages and computational infrastructures	Computational infrastructure (Linux servers for distribution modelling and phylogeny)
	(Marine) libraries	A library of books, dissertations, journals and reprints that currently includes over 23,000 titles which are all indexed in a database system
	Collections	• Ghent University algal herbarium (GENT) (25,000 algal specimens) • Culture collection of over 200 different strains of living green algae, representing most lineages of the Chlorophyta

Phycology

Krijgslaan 281, Building S8
B-9000 Ghent

Laboratory of **Protistology and Aquatic Ecology** (UGent)

// Website research group

http://www.ugent.be/we/biology/en/research/protistology/pae-home/

// Contact research infrastructure

Renaat Dasseville (Renaat.Dasseville@UGent.be)

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Molecular lab, experimental facilities for microbial studies, microscopy lab
	Class or accreditation	ISO 9001 certification of BCCM/DCG culture collection
	Analysis equipment, services and techniques	• Fluorescence microscope: Zeiss Axioplan 2 + Axiocam MRm • Scanning electron microscope: JEOL JSM-5600 LV • High-Performance Liquid Chromatography (HPLC): Agilent 1100 Series • Gas chromatography (GC): Agilent Technologies 6890N Network GC System + 7683B Series Injector + 5973 Network Mass Selective Detector • Beckman Multisizer 3 Coulter Counter • Perkin Elmer VICTOR 3 1420 Multilabel Counter • IMAGING Pulse Amplitude Modulated (PAM) fluorometry, M-series (maxi version & microscopy version), DIVING PAM, WATER PAM, Walz Mess- und Regeltechnik
	Collections	Diatom culture collection (http://bccm.belspo.be/catalogues/dcg-taxon-browser)

LPAE

Krijgslaan 281, Building S8
B-9000 Ghent

Renard Centre of Marine Geology (UGent)

// Website research infrastructure

http://www.rcmg.ugent.be/equipment.html

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Ship-based instrumentation	High and very-high resolution reflection seismic equipment: • In-house developed “Centipede” sparker • SIG sparker • Geopulse 3.5 kHz subbottom profiler • Seistec boomer-receiver system • In-house developed “VHR-3D” seismic array • Delph Seismic acquisition system (IXSEA) Side-scan sonar: • Klein 3000 side-scan sonar Multibeam swath-bathymetry echosounder: • Seabeam 1050 (50 kHz) • Octans motion sensor
	Fixed platforms, moorings and landers	Lake-coring equipment: • Uwitec coring platform • Deep-water (300 m) piston and Livingston corer • Bob corer
	Overview	PSA
	Type of laboratory / analyses	Sedimentological lab: different types of grainsize analysis (sedigraph, Malvern)
	Analysis equipment, services and techniques	Geotek multi-sensor core logger (gamma density, magnetic susceptibility, spectrophotometer, high-resolution photo line scanning) and core splitter
	Numerical models, specialised software packages and computational infrastructures	Geophysical software packages (e.g. Kingdom Suite, RadexPro, ArcGIS, Fledermaus, etc.)

RCMG

Krijgslaan 281, Building S8
B-9000 Ghent

Center for Mobility and Spatial Planning (UGent)

// Website research group

http://www.planning.ugent.be/

Satellites & (airborne) remote sensing capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
		GIS
	Numerical models, specialised software packages and computational infrastructures	GIS models/data
	(Marine) libraries	Library of AMRP with a collection focusing on spatial planning, economy and mobility

AMRP

Vrijdagmarkt 10/301
B-9000 Ghent

Coastal Engineering, Bridges and Roads unit (UGent)

// Website research infrastructure

http://www.ugent.be/ea/civil-engineering/en/research/coastal-bridges-roads/coastal-engineering/infrastructure-services


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

// Contact research infrastructure

Prof. Peter Troch (peter.troch@ugent.be)

Infrastructure Categories		Infrastructure
	Field instrumentation	• A Valeport MIDAS WTR Wave and Tide Recorder for measurements on beaches and near shore environments (<20 m depth) • Two Argus ASM-IV probes (high resolution measurements at the bottom of moving water) • An acoustic doppler velocimeter ADV (Nortek Vectrino) (3D water velocity measurements) • A modular run-up gauge (wave run-up measurements) • A radac Waveguide radar (measurements of wave climate in front of breakwater)
	Overview	
	Marine land-based facilities for engineering	• Small physical wave flume (Dimensions: 15.0 x 0.35 x 0.60 m (L x W x H). Design water depth: 0.30 m. Maximum wave height: 0.20 m) • Large physical wave flume (Dimensions 30.0 x 1.0 x 1.2 (L x W x H). Design water depth: 0.80 m. Maximum wave height: 0.35 m)
	Numerical models, specialised software packages and computational infrastructures	• MILDwave (in-house developed mild-slope wave propagation model) • ANASYS – GENESYS (tools for wave generation, absorption and analysis in combination with physical wave flumes)

Coastal Engineering

Technologiepark 904
B-9052 Ghent

Hydraulics laboratory (UGent)*

// Website research group

www.hydraulics.ugent.be/

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Marine land-based facilities for engineering	• The laboratory has a maximal pumping capacity of 0.5 m^3/s + 0.4 m^3/s (closed circuits) • Head = 5-6 mWK • Different current flumes and test tanks • A calibration channel for speedometers • Equipment for lab and field measurements: hydrometric mills, EMC's, ADV's, sediment transport.

*Content not validated by the research group

Hydraulics

Sint-Pietersnieuwstraat 41
B-9000 Ghent

Magnel laboratory (UGent)

// Website research infrastructure

- https://www.ugent.be/ea/structural-engineering/en/service
- http://www.concrete.ugent.be/


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	NDT testing (e.g.: Corrosion potential mapping, Concrete resistivity measurements, Rebar detection) Concrete core drilling Chloride content measurements (by means of RCT or potentiometric titration)
	Overview	
	Type of laboratory / analyses	The Magnel Laboratory for Concrete Research offers scientific services in various sectors of the construction industry (civil construction, industrial and domestic buildings, producers of construction materials, certification committees, public authorities, designers, contractors and owners). • Specialised laboratory tests • In situ assessments • Specialised calculations • Valorisation
	Class or accreditation	The Magnel Laboratory is certified according to EN ISO 17025 (accreditation certificates BELAC no 220-TEST and 220-CAL)
	Marine land-based facilities for engineering	With a large central testing hall of about 1.000 m² and numerous testing equipment, the Magnel Laboratory for Concrete Research is one of the biggest laboratories internationally (more information: https://www.ugent.be/ea/structural-engineering/en/research/magnel/services/labotests) Instruments relevant for marine research: • Rapid Chloride Migration (RCM or CTH) • Chloride resistance testing • Chloride profiles (RCT, potentiometric titrations) • Sulphate resistance testing • Testing apparatus for accelerated degradation tests (TAP) • Scanning Electron Microscopy (SEM) • Optical microscopy and analysis of thin sections • Water permeability setups
	Other experimental facilities and analysis capacity	• A large number of hydraulic jacks for static and dynamic loading tests • Special equipment for measurements and data acquisition • Climate rooms (up to 50°C, 30% - 95% RH – CO2 concentration: 0 - 10 vol%), ovens (up to 1160°C) and freeze chambers (up to -20°C) • Test configurations for durability tests: Carbonation (climate chamber) / Alkali-silica reaction (Oberholster test) / Frost-resistance (in combination with de-icing salts) / Acid resistance / Degradation by aggressive liquids / Roughness measurements (ALM) / etc. • Concrete mixing and testing of fresh concrete properties (slump, flow, air content, etc.), equipment for monitoring of concrete setting and hardening (continuous ultrasound transmission, isothermal and (semi-)adiabatic calorimetry, traditional methods), equipment for porosity measurements (MIP, AirVoid, etc.), equipment for characterising cement (laser diffractometer, Blaine, etc), equipment for characterising aggregates (sieve analysis, water absorption, shape factor, density, etc.), gas permeability setups, etc. • Numerous equipment for testing the characteristics of various building materials such as cement, aggregates, concrete, masonry, reinforcement, etc.
	Numerical models, specialised software packages and computational infrastructures	Specialised software in order to simulate the behaviour of concrete (more information: https://www.ugent.be/ea/structural-engineering/en/research/magnel/services/calculation): • COMREL, SYSREL and STATREL (RCP GmbH) (Risk Analysis Software which can be used for probabilistic service life assessment in marine environments in accordance with DuraCrete or fib Bulletin 34) • ATENA (Cervenka Consulting) (Nonlinear Finite Element Analysis of Concrete Structures) • FreET and SARA (Cervenka Consulting) (Risk Analysis Software) • Matlab (Technical Computing Software) • Numerous in-house developed software packages for specific purposes

Magnel

Technologiepark 904
B-9052 Ghent

Maritime Technology division (UGent)

// Website research infrastructure

http://www.maritiem.ugent.be/en/research_sleeptank.htm

// Contact research infrastructure

maritiem@ugent.be

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Marine land-based facilities for engineering	Towing tank (in co-operation with Flanders Hydraulics Research): a shallow water towing tank, equipped with a planar motion carriage, a wave generator and an auxiliary carriage for ship-ship interaction tests (Total length: 88.0 m, Useful length: 67.0 m, Width: 7.0 m, Maximum water depth: 0.5 m, Ship model length: 3.5 - 4.5 m)
	Numerical models, specialised software packages and computational infrastructures	Specific maritime software packages: *Probabilistic and deterministic access policy:* • ProToel (in co-operation with Flanders Hydraulics Research) *Mooring ships behaviour:* • Ropes • Vlugmoor • Optimoor *Hydrostatics:* • Delftship (complete design package for application in the marine industry) • ArchimedesMB • HeelMe • Wolfson Unit *Calculation in seaway:* • Octopus Seaway • WAMIT *Resistance and propulsion:* • PSP Wageningen Propeller Series • Hydrocomp NavCad • Hydrocomp PropCad • Hydrocomp SwiftCraft *Ship Construction:* • Bureau Veritas eRules
	Simulators	See Flanders Hydraulics Research (Watlab)

Maritime Technology

Technologiepark 904
B-9052 Ghent

Department of **Materials Science and Engineering** (UGent)

// Website research infrastructure

http://www.composites.ugent.be/facilities.html

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

// Contact research infrastructure

Prof. dr. Wim Van Paepegem
(Wim.VanPaepegem@UGent.be)

Infrastructure Categories		Infrastructure	
	Overview		
	Type of laboratory / analyses	Mechanical engineering laboratory - Mechanical testing of materials under static, fatigue, impact and vibration loads	
	Analysis equipment, services and techniques	Test set-ups for static/impact/fatigue/vibration testing, 3 high-speed cameras, high-speed data-acquisition (see also Marine land-based facilities for engineering), full-field measurement software for displacements/strains/deformations (see also Numerical models, specialised software packages and computational infrastructures)	
	Marine land-based facilities for engineering	*Impact:* • bird strike set-up for real birds and gelatine replicas • pneumatic launcher • two drop weight towers (3 m and 6 m) • pendulum impact test rig for glass windows • lab-scale set-up for slamming wave impact • three digital high speed cameras (up to 250,000 fps) • high-end transient recorder/oscilloscope (up to 100 MHz sampling rate) • Charpy impact tests (dynamic fracture toughness) • dynamic load cells, accelerometers, displacement sensors *Non-destructive testing (NDT) & evaluation (NDE):* • 2D and 3D Digital Image Correlation (static and high-speed) • optical fibre sensors and read-out equipment (up to 2 kHz) • ultrasound phased array (64 probes) • shadow and projection moire • ultrasound scanning facility for C-scans and polar scans • Schlieren set-up for acousto-optics research *Fatigue:* • two servohydraulic machines	• accessoiries for tension-compression and pure shear testing • devices for 3- and 4-point bending • two extensometers • electrical resistance measurement *General mechanics of composite materials:* • electromechanical testing machine with temperature chamber (-150 C to +350 C) • electrodynamic shaker (up to 10 kHz) • laser vibrometer • set-up for measurement of modal frequencies and frequency-dependent modal damping • test set-ups for static and dynamic testing of racing bicycle frames • fracture mechanics tests for composites and polymers (DCB, ENF, ELS, TDCB, CT) • fracture mechanics tests for adhesives (dolly testing, DCB testing) • long-term experience with outdoor field testing without electrical grid connection (sailing yachts, wave energy devices, bicycle frames, etc.) • hand lay-up and vacuum assisted resin transfer moulding • infrared welding set-up • autoclave with cure monitoring • filament winding machine • measurement of fibre volume fraction of carbon and glass fibre composites
	Numerical models, specialised software packages and computational infrastructures	*Commercial software:* • implicit and explicit finite element suite ABAQUS • explicit finite element code LS-Dyna • open source finite element code Code_Aster • HyperMesh and Gmsh high-performance finite-element pre-processors • composite draping software (Catia/CPD, Simulayt/Composite Modeler) • software for kinematics and multibody dynamics (Universal Mechanism) • optimisation software (iSight, evolutionary strategies) • numerical software (Mathcad, Matlab, Maple, Mathematica) • CAD/CAE software (SolidWorks, Catia) • data acquisition software (LabVIEW)	*In-house developments:* • SERVE: Statistically Equivalent Representative Volume Element (RVE) software • ORAS: Object-Oriented RVE Assembly Software • Blade Mesher: meshing tools for large wind turbine blades • five workstations for intensive calculations • parallel computing infrastructure for finite element calculations (12000+ cores, 3.2 Terabyte RAM) • supernode with 720 GB RAM

Materials Science and Engineering

Technologiepark 903
B-9052 Ghent

Soete laboratory (UGent)*

// Website research group

http://www.soetelaboratory.ugent.be/

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure	
	Overview		
	Marine land-based facilities for engineering	*Universal test rigs:* • ESH 100, 150 and 1000 kN servo-hydraulic • MTS 2500 kN servo-hydraulic • Amsler 1000 kN • Hydropulse 200 kN servo-hydraulic • MB 600 kN servo-hydraulic • MTS 2500 kN servo-hydraulic • Amsler 600 kN tensile test bench *Tribological test rigs:* • Large-scale bearing LSB test-rig • Large-scale flat LSF tribometer 1 • Large-scale tribometer 2 (MTS) • Medium-scale flat MSF tribometer • Modified FZG tester • High Temperature Tribometer • Pin-on-disc tester • Plate-on-plate clutch tester • Plint reciprocating tribometer TE77 • Rotating stick-slip tester • Small scale reciprocating stick-slip tester • Torque Machine • Shackle chain wear test rig • Conveyor chain wear test rig	*Fatigue Testing:* • Resonant bending fatigue setup RBFS for pipes • Modular test floor 1350 kN • Four point bending • Internal pressure • Pulsator test rig for beams and girders *Fracture Mechanics Testing:* • Wide Plate Setup • Charpy test setup • CTOD tests Miscellaneous: • 3D Dynamic Optical Displacement Measuring • 3D Static Optical Full-field Strain and Profile Measuring • Direct Current Potential Drop • Infrared Thermography • Automatic Vickers hardness tester • Roughness testers • Strain gauging • Production facilities
	Numerical models, specialised software packages and computational infrastructures	*Finite Element Software:* • Abaqus • Ansys • CosmosWorks • WARP3D • ThreadGen *Numerical and analytical calculations:* • Matlab • Maple *CAD:* • SolidWorks	

*Content not validated by the research group

Soete Laboratory

Technologiepark 903
B-9052 Ghent

Laboratory of **Aquaculture and Artemia Reference Center** (UGent)

// Website research group

www.aquaculture.ugent.be/index.htm

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Class or accreditation	All wetlabs are safety level L2
	Aquaculture experimental facilities	• 5 poly wetlabs (temperature range 12 – 30°C, programmable light regime) • 1 wetlab to work under axenic conditions (temperature range 12 – 30°C, programmable light regime) • 1 wetlab for rotifer experiments • 1 wetlab for experiments with artemia • 1 wetlab for broodstock shrimps • 1 wetlab for freshwater experiments (temperature range 15 – 30°C, programmable light regime) • 1 lab for artemia quality control • 1 lab for artemia strains

Artemia Reference Center

Rozier 44
B-9000 Ghent

Laboratory of **Environmental Toxicology and Aquatic Ecology** (UGent)

// Website research infrastructure

http://www.milieutox.ugent.be/research-approaches-and-equipment

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	PSA  CHR MS
	Type of laboratory / analyses	State of the science ecotoxicological laboratory with various exposure rooms (single and multispecies assay facilities), culture rooms (different algal and invertebrate species) and analytical equipment.
	Analysis equipment, services and techniques	• X-ray fluorescence techniques (in collaboration with the X-ray Microspectroscopy and Imaging Group at UGent (www.xmi.ugent.be) • Passive samplers • Micro-array and qPCR (in collaboration with the University of Antwerp the Daphnia Genomics Consortium and the University of Indiana) • Micro CT scanning (in collaboration with UGCT of UGent) • Metal measurements (Thermo CE 3000 series Atomic Absorption spectrometer & Metrohm 797 VA Computrace Voltammeter) • Total Organic Carbon (TOC) analyser (Shimadzu TOC-5000 A) • Gas chromatography–mass spectrometry (GC-MS) (Thermo Quest Finnigan Trace DSQ coupled to a Thermo Quest Trace 2000 series GC) • Spectrophotometer (Thermo Multiskan Ascent plate-reader) • Coulter counter (Beckman Z-1000 Coulter Counter) • Standard cultures of several test species • Climate rooms • Reverse osmosis system

GhEnToxLab

Jozef Plateaustraat 22
B-9000 Ghent

Laboratory for **Food Microbiology and Food Preservation** (UGent)

// Website research infrastructure

http://www.foodscience.ugent.be/LFMFP/Equipment

Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Overview	CHR MS
	Type of laboratory / analyses	Microbial analysis of food
	Class or accreditation	Class 2
	Analysis equipment, services and techniques	• CheckMate 9900 O2/CO2 (PBI Dansensor, CheckMate 9900) • CheckPoint O2/CO2 (PBI Dansensor, handheld analyser) • Headspace Gas chromatography–mass spectrometry (GC-MS) (Agilent 7890A chromatograph and an Agilent 5975C-Inert XL Mass Selective Detector with CombiPAL autosampler) • SYFT MS to analyse volatile metabolites • High-Performance Liquid Chromatography (HPLC) • Inverted epifluorescence microscope (Zeiss Axiovert 135 TV) coupled with a cooled camera • OxySense® 210T (optical oxygen analyser) • Gas packaging unit: MULTIVAC Packaging Machine (Modified Atmosphere Packaging), Traysealer • Spectramax Gemini XS (a variety of fluorescent applications as well as some time-resolved fluorescent and luminescent assays) • VERSAmax Microplate reader • Anaerobic chamber • Water activity measurements: Novasina, cryo • Seahorse equipment of Bioscience • Bio Safety Cabinet 1 (Holten, Bio Safe 1.2) • Bio Safety Cabinet 2 (Scanlaf, Mars 1200) • Bio Safety Cabinet 3 (Heraeus, Herasafe HS12) • CO2 incubator 9 (Binder, APT.line C150 (E2)) • GeneDisc Cycler • PCR system • Vidas

LFMFP

Coupure Links 653
Building B, 4th floor, B4.022
B-9000 Ghent

Laboratory for **Microbial Ecology and Technology** (UGent)

// Website research infrastructure

http://www.labmet.ugent.be/node/401

// Contact research infrastructure

labmet@ugent.be

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure	
	Overview	CHR	
	Type of laboratory / analyses	LabMET performs a wide array of analyses in the field of microbiology such as: • Microbial analyses: conventional and molecular methods • Genetics (DNA & RNA extractions, PCR, cloning/sequencing, fluorescence in situ hybridisation (FISH), etc.) • Bioassays and biodegradation assays • Batch and continuous (high pressure) reactor technology	
	Class or accreditation	Biosafety level 1 and 2 facilities	
	Analysis equipment, services and techniques	• Light microscopy • Epifluorescence microscopy (Zeis & polyvar) • Real-Time PCR (abi prism 7000 & StepOnePlus™ System) • Denaturing Gradient Gel Electrophoresis (DGGE) with gel analysis software (BioNumerics) • Flow cytometry (BD Accuri) • Pippeting robot (Biorobot 3000) • Various devices related with reactor technology such as high pressure reactor to simulate deep-sea conditions • Gas chromatography (GC): - Varian GC FID (determination of chlorinated solvents, VOCs, hydrocarbons, alcohols, fatty acids) - Varian GC ECD (determination of lindane and PCB's) - Shimadsu GC 2014 FID + autosampler (determination of short chain VFAs) - Shimadsu GC for biogas and Interscience Compact GC (determination of CH_4, N_2, H_2, O_2, CO_2 & N_2O) - High Pressure Liquid Chromatography (HPLC) (UV and Fluorescence detector) (Dionex) (analysis of pharmaceuticals, pesticides organic choride contaminations, sugars)	• Ion chromatography for anions (761. Metrohm compact IC) (e.g. nitrate, nitrite, chloride, phosphate, sulphate, etc.) • Ion chromatography for cations (e.g. ammonium, etc.), sugars (Dionex) • UV-VIS Spectrophotometry for colorimetric determination of ammonium, phosphate, nitrite, nitrate, etc. • Atom Absorption Spectrometry for analysis of Ag, Mn, Fe, Ni, Au, Pd, Co, Cu, Zn, etc. • Biological oxygen demand (BOD) • Chemical oxygen demand (COD) • Furnaces and centrifuges for determination of total and volatile suspended solids (TSS & VSS) • Steam distillation units and heating blocks for determination of ammonium, nitrite+nitrate, Kjeldahl nitrogen • Galvanic, polarographic and luminescent probes for dissolved oxygen (DO) determination • Probes for pH, conductivity and temperature measurements
	Numerical models, specialised software packages and computational infrastructures	Bionumerics for microbial community analysis	

LabMET

Coupure Links 653
B-9000 Ghent

Research group on **Soil Spatial Inventory Techniques** (UGent)*

// Website research infrastructure

http://www.ugent.be/bw/soilmanagement/nl/onderzoek/bodeminventarisatietechnieken-orbit/services

Sampling, observation & survey infrastructure

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	The following soil sensors are used: • Electromagnetic induction (EMI): Dualem 1, Dualem 21, Dualem 421 set-up • Ground penetrating radar (GPR): 3D radar GPR & GSSSI Scan Utility DF • Magnetometry: Sensys, 5 gradiometers
	Numerical models, specialised software packages and computational infrastructures	The mobile proximal soil sensors are combined with precise GPS-positioning, geostatistical processing and GIS-cartography.

*Content not validated by the research group

ORBit

Building B - 1st floor
Coupure links 653
B-9000 Ghent

Laboratory for **Chemical Analysis** (UGent)

// Website research infrastructure

http://www.vvv.ugent.be/

// Contact research infrastructure

Prof. Lynn Vanhaecke (Lynn.Vanhaecke@UGent.be)

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	CHR MS
	Type of laboratory / analyses	Chemical laboratory
	Class or accreditation	BELAC (ISO 17025) accreditated (certificate 066-TEST)
	Analysis equipment, services and techniques	*Devices for detection:* • Ekspert-U-HPLC system coupled to APCI/TIS TripleTOF (high resolution accurate mass spectrometer) (U-HPLC-QqTOF) • Accela U-HPLC system coupled to HESI/APCI Exactive Orbitrap-HRMS (high resolution accurate mass spectrometer) (U-HPLC-HRMS) • Accela U-HPLC system coupled to HESI/APCI TSQ Vantage (triple stage quadrupole mass spectrometer) (U-HPLC-MS/MS) • Accela U-HPLC system coupled to HESI/APCI LTQ XL linear ion trap mass spectrometer (U-HPLC-MSn) • Finnigan surveyor LC system coupled to HESI/APCI LTQ linear ion trap mass spectrometer (LC-MSn) • Agilent 1100 series LC coupled to ESI/APCI ion trap LCQ Deca ion trap mass spectrometer (LC-MSn) • Photodiode Array Detector (Accela PDA) • Fluorescence Detector (Accella FLU) • Evaporative Light Scattering Detector (ELSD 3300) • Gas chromatograph (Trace GC) coupled to EI/NCI ion trap PolarisQ mass spectrometer (GC-MSn) *Equipment and techniques for extraction and clean-up:* • Dionex Accelerated Solvent Extraction (ASE350) • Solid Phase Extraction (SPE) • Liquid liquid extraction (LLE) • High Pressure Liquid Chromatography (HPLC)-fractionation • Centrifuges • Vacuum dryers • Nitrogen evaporators • Shaker incubator
	Numerical models, specialised software packages and computational infrastructures	Metabolomics software (Sieve, SIMCA)

LCA

Salisburylaan 133
B-9820 Merelbeke

Department of **Morphology** (UGent)

// Website research infrastructure

http://www.ugent.be/di/morfologie/nl/dienstverlening

// Contact research infrastructure

Prof. Wim Van Den Broeck (Wim.VandenBroeck@UGent.be)
Prof. Annemie Decostere (Annemie.Decostere@UGent.be)

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Morphological laboratory
	Analysis equipment, services and techniques	• Light and fluorescence microscopy (LM, FM) • Scanning Electron Microscopy (SEM) • Transmission Electron Microscopy (TEM) • Immunohistochemistry and immmunofluorescence labeling for LM/FM analysis • immunogold labeling for TEM analysis • stereology • 3D reconstrution based on histological sections
	Aquaculture experimental facilities	Fully segregated experimental challenge units (biotic (infectious agents) and abiotic challenges) for marine vertebrate and invertebrate species (larval stages, juveniles and adults) (in construction)
	Numerical models, specialised software packages and computational infrastructures	3D reconstruction based on histological sections

Morphology

Salisburylaan 133
B-9820 Merelbeke

Department of **Movement and Sport Sciences** (UGent)

// Website research group

http://www.ugent.be/ge/bsw/en

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Type of laboratory / analyses	Complete biomechanical and physiology laboratory (new since December 2014, with climate chamber) for anthropometrical and body composition analysis of humans, human muscle biochemistry, and biomechanical and physiological analysis of exercise, physical activity and occupational activity

Movement and Sport Sciences

Watersportlaan 2
B-9000 Ghent

Department of **Archaeology** (UGent)

// Website research group

http://www.archaeology.ugent.be/en


Sampling, observation & survey infrastructure


Satellites & (airborne) remote sensing capacity


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	GPS Trimble R10
		Drone DJI Phantom II
	Overview	
	Type of laboratory / analyses	Laboratory for standard analysis of archaeological finds
	Analysis equipment, services and techniques	Microscopes
	(Marine) libraries	Archaeology library (http://www.archaeology.ugent.be/library)
	Collections	Archaeological museum (http://www.archaeology.ugent.be/archaeologicalcollection)

Archaeology

Ufo
Sint-Pietersnieuwstraat 35
B-9000 Ghent

KU Leuven University

// Science, Engineering and Technology Group

- Laboratory Aquatic Biology
- Laboratory of Biodiversity and Evolutionary Genomics
- Laboratory Food and Lipids
- Division of Geology
- Hydraulics laboratory

// Biomedical Sciences Group

- Laboratory for Toxicology and Pharmacology

// Rega Institute

- Bioinformatics and (Eco-)systems Biology lab

Laboratory **Aquatic Biology** (KU Leuven)

// Website research infrastructure

http://www.kuleuven-kulak.be/en/research/research-at-kulak/aquatische-biologie/FacilitiesenServices

Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Overview	CHR
	Type of laboratory / analyses	Analyses of algal biomass
	Analysis equipment, services and techniques	• Carotenoid and chlorophyll content (spectrophotometer) • Carotenoid and chlorophyll profiling by HPLC, including esterified carotenoids such as astaxanthin • Phycocyanin content in *Spirulina* • Total lipid content according to Ryckebosch et al. (2011) • Separation of lipid classes (neutral, phospho- and glycolipids) • Fatty acid analysis of total lipids and lipid classes using GC (range from 8:0 to 24:1) • Free fatty acid content • Degree of lipid oxidation • Protein content and amino acid profiling • Phytosterol and cholesterol analysis • Antioxidant activity, using TEAC, FRAP, AIOLA and square wave voltammetry • Carbohydrate content and composition • Polyphenol and flavonoid content • Ash content and analysis of major minerals
	Aquaculture experimental facilities	*Experimental services:* • Batch, fed-batch and continuous production of microalgae in lab (1-2 L) and pilot scale photobioreactors (30-120 L) or raceway ponds (30 L) • Experiments with economically relevant microalgal model species (*Chlorella, Phaeodactylum, Nannochloropsis, Spirulina / Arhtrospira, Oscillatoria, Isochrysis, Scenedesmus, Microcystis, Pavlova, Tetraselmis, Haematococcus, Botryococcus*) • Flocculation of microalgae: pH-induced auto-flocculation, electro-flocculation, flocculation using metal salts or biopolymers • Harvesting by cross-flow membrane filtration, centrifugation, and freeze-drying facilities • Lab-scale extraction and biorefinery • Microalgal growth assays in wastewater, including nutrient removal efficiency • Pulse Amplitude Modulated fluorescence (PAM) measurements for algae viability evaluation

Aquatic Biology

E. Sabbelaan 53
B-8500 Kortrijk

Laboratory of **Biodiversity and Evolutionary Genomics** (KU Leuven)

// Website research infrastructure

http://bio.kuleuven.be/eeb/lbeg/consulting.html

// Contact research infrastructure

Bart Hellemans (bart.hellemans@bio.kuleuven.be or info@biogenomics.eu)

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	• Microscope unit for sample sorting and identification • Medium throughput molecular DNA lab
	Analysis equipment, services and techniques	*Equipment:* • Capillary sequencer (Applied Biosystems ABI 3130) • qPCR unit (Applied Biosystems ABI 7000) • gradient PCR unit (Biometra Tgradient) • 3 96-well PCR units (Biometra T1, Applied Biosystems Gene Amp 2700, Bio-Rad My Cycler) • Attune flow cytometer (LifeTechnologies) *Services:* • Genetic marker discovery (neutral and gene linked SSRs and SNPs) • Sequencing (Low and Medium (ABI 3130) throughput sequencing, Next generation sequencing (Illumina HiSeq/MiSeq through Genomics Core – KU Leuven)) • Genotyping (from low to high throughput SSRs, AFLPs and SNPs genotyping) • Identification of species (DNA barcoding) • Traceability (populations and pedigrees) • Selective breeding 'broodstock management, QTL analysis and Marker Assisted Selection) • Health Management and Molecular Parasitology (identification and quantification of pathogens in aquatic organisms and problem solving in fish health management) • Development of biomarkers (characterisation and evaluation of molecular biomarkers as sentinel for organic and inorganic pollutions (e.g. PAH, PCB, heavy metals and pesticides)) • Bioinformatic Tool Development and Training
	Aquaculture experimental facilities	50 tanks in temperature controlled room for selective breeding of small sized freshwater fish
	Numerical models, specialised software packages and computational infrastructures	Capacity and expertise for the bioinformatic analysis of next generation sequencing output
	Collections	Collection of population samples of some 10 species for the purpose of genotyping and molecular studies

LBEG

Charles Deberiotstraat 32,
bus 2439
B-3000 Leuven

Laboratory **Food and Lipids** (KU Leuven)

// Website research group

http://www.kuleuven-kulak.be/foodandlipids

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	CHR
	Type of laboratory / analyses	Chemical lab
	Analysis equipment, services and techniques	• Gas Chromatography (determination of fatty acids) • High-performance liquid chromatography (HPLC) (determination of carotenoids) • Lipid content

Food and Lipids

Etienne Sabbelaan 53
B-8500 Kortrijk

Division of **Geology** (KU Leuven)

// Website research group

http://ees.kuleuven.be/geology/index.html

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	XRD
	Type of laboratory / analyses	Sedimentology lab, geochemistry labs, micropaleontology lab, mineralogy (X-ray) lab, Computed tomography, microprobe analysis
	(Marine) libraries	Ellis and Messina Catalogue on foraminifera
	Collections	Foraminifera collections (NW Europe, Mediterranean region), mostly Cenozoic

Division of Geology

Celestijnenlaan 200E
bus 2408
B-3001 Heverlee

Hydraulics Laboratory (KU Leuven)

// Website research infrastructure

http://bwk.kuleuven.be/hydr/Research/urban-river/measure

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Marine land-based facilities for engineering	• An autonomous water circulation system • A number of test facilities including 2 flumes: 1 general purpose flume (wxhxl-=0.5m x 0.6m x 12m) and 1 erosion flume (wxhxl-=0.4m x 0.4m x 8m) • Associated measuring equipment: ultrasonic level gauges, acoustic doppler velocity meters, flow meters, turbidity meters
	Other experimental facilities and analysis capacity	1 cool temperature controlled room

Hydraulics Laboratory

Kasteelpark Arenberg 40
bus 2448
B-3001 Heverlee

Laboratory for **Toxicology and Pharmacology** (KU Leuven)

// Website research group

https://pharm.kuleuven.be/toxico/english/home.htm

Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Overview	CHR MS
	Type of laboratory / analyses	Toxicological and pharmacological laboratory
	Analysis equipment, services and techniques	• Liquid chromatography–mass spectrometry (LC-MS) • High-Performance Liquid Chromatography (HPLC) with UV, DAD, refraction, fluorescence, and electrochemical detection • Miniaturised HPLC with UV detection and automated fraction collection • Fast protein liquid chromatography (FPLC) with UV detection, preparative columns and automated fraction collection • Capillary Gas Chromatography (GC) with split/splitless, on column, purge and trap injection, coupled to MS, ECD, FID and NPD detection • Thin-layer chromatography (TLC) with scanning device • Immunoassays : RIA, FPIA and EMIT • Beta and gamma (scintillation) counters • UV spectrophotometry • Atomic Absorption (AAS) spectrometry • Differential Pulse Polarography • Extractions: Liquid-Liquid, Solid phase, Headspace Solid Phase Microextraction (HSPME) • Lyophilisator • Speed-vac concentrator • Low temperature asher • Gel electrophoresis for nucleic acids and peptides • Patch and voltage clamp setup • Micro-injector (mRNA) • *Xenopus laevis* oocyte expression system • Library of 60 cDNAs encoding a diverse array of voltage-gated ion channels and receptors (Nav, Kv, Cav, TRP, CB, nAChR, MOR, etc.)

Toxicology & Pharmacology

O&N II Herestraat 49
bus 922
B-3000 Leuven

Bioinformatics and (Eco-)systems Biology lab (KU Leuven)

// Website research group

www.raeslab.org

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	-omics/bioinformatics lab • Functional and taxonomic analysis of microbial communities investigated using metagenomics and metatranscriptomics data • Discovery of species interactions in microbial communities and the impact of environment in community structure
	Numerical models, specialised software packages and computational infrastructures	• Supercomputing: 14 * 12 cores and 32G of RAM and 2 * 64 cores and 500G of RAM / 40 Terabytes of storage • CoNet: a tool that detects significant non-random patterns of co-occurrence (copresence and mutual exclusion) in incidence and abundance data • LotuS: a simple demultiplexer, complete 16S amplicon pipeline and quality filtering of sequences

Raes lab

KU Leuven
Campus Gasthuisberg
O&N I Herestraat 49 - box 1028
B-3000 Leuven

Vrije Universiteit Brussel

// Faculty of Science and Bio-engineering Sciences

- Research group Analytical, Environmental and Geochemistry
- Research group Marine Biology
- Research group Physical Geography
- Plant Biology and Nature Management laboratory

// Faculty of Engineering

- Acoustics and Vibration research group
- Department of Hydrology and Hydraulic Engineering

// Faculty of Arts and Philosophy

- Department of Art Sciences and Archaeology

Research group **Analytical, Environmental and Geochemistry** (VUB)

// Website research infrastructure

http://we.vub.ac.be/~essc/

// Contact research infrastructure

Prof. dr. Philippe Claeys (Phclaeys@vub.ac.be)

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Underwater vehicles, drifters and floats	Seaglider
	Overview	CHR MS
	Type of laboratory / analyses	• Trace elemental labs including clean rooms • Stable isotope laboratory
	Class or accreditation	Clean rooms
	Analysis equipment, services and techniques	• Nu-Plasma Dual Inlet Perspective stable isotope mass spectrometer instrument dual inlet coupled with an automated carbonate device and a GasPrep Equilibration device • 3 Isotope ratio mass spectrometers including coupling with GC, and other automated peripherals • Picarro Cavity Ring-Down Spectroscopy • High resolution and low resolution ICPMS including coupling with laser ablation • A CALUX (chemically activated luciferase expression) bio-assay

AMGC

Pleinlaan 2
B-1050 Brussels

Research group **Marine Biology** (VUB)

// Website research group

http://we.vub.ac.be/nl/environment-biodiversity-and-ecosystems/research#Marine%20Biology

Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	• Molecular genetic laboratory • Wet lab
	Analysis equipment, services and techniques	PCR
	Aquaculture experimental facilities	Tropical marine aquarium

Marine Biology

Pleinlaan 2
B-1050 Brussels

Research group **Physical Geography** (VUB)

// Website research group

http://www.vub.ac.be/DGGF/fard/fard.htm

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Numerical models, specialised software packages and computational infrastructures	3-D thermomechanical ice-sheet model
	(Marine) libraries	Library of the Geography Department (http://homepages.vub.ac.be/~jdbruyne/library-eng.html)

FARD

Pleinlaan 2
B-1050 Brussels

Plant Biology and Nature Management laboratory (VUB)

// Website research infrastructure

BIOSTRµCT – under construction

// Contact research infrastructure

dr. Elisabeth Robert (erobert@vub.ac.be)

Satellites & (airborne) remote sensing capacity

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
		According to research needs (see reference to remote sensing in publications)
	Overview	
	Type of laboratory / analyses	Conservation Genetics lab / Microsatellite development, multiplexing PCR, sequencing, cpDNA genome analysis
	Analysis equipment, services and techniques	Micro-CT-scan (Skyscan1172)
	other experimental facilities and analysis capacity	Greenhouses where (amongst others) mangrove plants are grown.
	Numerical models, specialised software packages and computational infrastructures	In collaboration with NASA – JPL (dr. D. Menemenlis) – high spatio-temporal resolution models on global ocean wind and currents
	Collections	Herbarium BRVU (specimens and voucher specimens)

APNA

Pleinlaan 2
B-1050 Brussels

Acoustics and Vibration research group (VUB)*

// Website research infrastructure

- http://mech.vub.ac.be/avrg/consulting.htm#Vibration%20Testing
- http://mech.vub.ac.be/facilities.htm

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Marine land-based facilities for engineering	*Techniques:* • Vibration & Durability Testing • Structural Dynamics Testing *Equipment:* • Anechoic Acoustic Room • Polytec Scanning Laser Doppler Vibrometer • IST Hydraulic Test Rigs • LMS Scadas-III Front-End • Combustion Engine Test Rig • Wind Tunnels: - Low speed tunnel for turbulence research with a deformable upper wall (length 8 m, test section 1.4 m x 0.4 m) - Low speed tunnel for industrial aerodynamics (length 12 m, test section 2 m x 1 m) • Turbomachinery: Test rig for hydraulic turbines and pumps - Laser Doppler System with Test Bench - Axial Test Pump in Test Bench with LDS probe lens
	Numerical models, specialised software packages and computational infrastructures	Signal Processing and Modal Analysis

*Content not validated by the research group

AVRG

Z-building
Entrance 8 (Avenue de la Triomphe)
B-1050 Brussels

Department of **Hydrology and Hydraulic Engineering** (VUB)

// Website research group

http://twws6.vub.ac.be/hydr/indexEng.htm

// Contact research infrastructure

Prof. dr. ir. Margaret Chen (margaret.chen@vub.ac.be)


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Fixed platforms, moorings and landers	Mobile underwater sampling frame with multiple sensors
	Type of laboratory / analyses	• Radio-isotope lab analysis • Sedimentological lab analysis
	Numerical models, specialised software packages and computational infrastructures	Developing a storm surge model and a flooding model of the Belgian coastal area

HYDR

Pleinlaan 2
B-1050 Brussels

Department of **Art Sciences and Archaeology** (VUB)

// Website research group

http://www.vub.ac.be/SKAR/

Sampling, observation & survey infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	• Foerster Magnetometer • XRF-instrument

SKAR

Pleinlaan 2
B-1050 Brussels

Flemish Scientific Institutes

// Flanders Heritage Agency
// Flanders Hydraulics Research
// Flanders Marine Institute (VLIZ)
// Flemish Institute for Technological Research (VITO)
// Research Institute for Nature and Forest (INBO)
// Institute for Agricultural and Fisheries Research (ILVO)
// Botanic Garden Meise

Flanders Heritage Agency

// Website research infrastructure

https://www.onroerenderfgoed.be/nl/diensten/

// Contact research infrastructure

dr. Marnix Pieters


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Ship-based instrumentation	• Flanders Heritage Agency frequently uses the multi-beam present on the RV Simon Stevin (see Flanders Marine Institute). • The agency also uses a - specifically for its IWT-Project developed - so-called 'Gilson-trawl' and a Hamon grab to collect coarse elements present on the seabed. • Flanders Heritage Agency intends to use the vibrocorer that will be installed on the RV Simon Stevin (see Flanders Marine Institute).
	Type of laboratory / analyses	• Depot and conservation lab for archaeological finds (https://www.onroerenderfgoed.be/nl/diensten/depot) • Depot facilities at the Marine Station Ostend (see Flanders Marine Institute)
	Analysis equipment, services and techniques	• Vats • Lifting device (limited to 2,000 kg) • A set for producing demineralised water for treating archaeological objects from the sea
	(Marine) libraries	The library of the Flanders Heritage Agency (https://www.onroerenderfgoed.be/nl/diensten/bibliotheek)
	Marine data centres	Several databases, geoportals and registers, ***inter alia*** about historical fleet and maritime archeology (http://www.maritieme-archeologie.be/)
	Collections	Archives (https://www.onroerenderfgoed.be/nl/diensten/archief) and an image collection (https://www.onroerenderfgoed.be/nl/diensten/beeldbank)

Flanders Heritage Agency

Phoenixgebouw 8th floor
Koning Albert II-laan 19, bus 5
B-1210 Brussels

Flanders Hydraulics Research

// Website research infrastructure

http://www.flandershydraulicsresearch.be/facilities-and-tools


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Underwater vehicles, drifters and floats	Wave-resisting drifters for 1 m depth velocity measurements in the intertidal zone
	Ship-based instrumentation	ADCP, LISST, Echosounder, Aanderaa, YSI
	Fixed platforms, moorings and landers	Inox frames for mounting oceanographic instruments (HERCULES frame: LxWxH: 2.4 m x 2.4 m x 1.8 m; HYLAS frames: LxWxH: 2 m x 2 m x 1.5 m)
	Field instrumentation	AWAC, Aquadopp, Vector, OBS, High Frequency pressure sensors, Sand Ripple Profiler, Aquascat, datalogger synchronisation, Valeport ECM
	Overview	
	Type of laboratory / analyses	Sedimentological laboratory
	Analysis equipment, services and techniques	• Sediment concentration in water samples • Grain-size analysis • Organic material content • Salinity of water samples • Microscopic analyses (incl. electronic microscopy) • Calibration of instruments • Etc.
	Marine land-based facilities for engineering	• Wave flume (70 m x 4 m x 1.4 m) with a piston-type wave generator • Wave basin (17.5 m x 12.2 m x 0.45 m) • Multifunctional test basin (19 m x 9.8 m x 1.6 m) • Towing tank (88 m x 7 m) (in cooperation with Ghent University) • Two experimental flumes (31.7 m x 0.7 m x 0.86 m and 34.8 m x 0.5 m x 0.76 m) • Current flume (56.2 m x 2.4 m x 1.15 m) • A physical model of the port of Zeebrugge
	Numerical models, specialised software packages and computational infrastructures	*Hydraulic and hydrological software:* • DELFT3D software of Deltares • SWAN software of TUDelft • LITPACK software of Danish Hydraulic Institute • MIKE11 software of Danish Hydraulic Institute • 1D-model developed by Flanders Hydraulics Research • SIS software of HR Wallingford • PHAROS software of Deltares The HYDRA information system (data management system)
	Simulators	*Three bridge simulators for ship manoeuvring:* • SIM 360+ • SIM 225 • LARA
	(Marine) libraries	Flanders Hydraulics Research library (http://www.flandershydraulicsresearch.be/publications)

Flanders Hydraulics Research

Berchemlei 115
B-2140 Antwerp

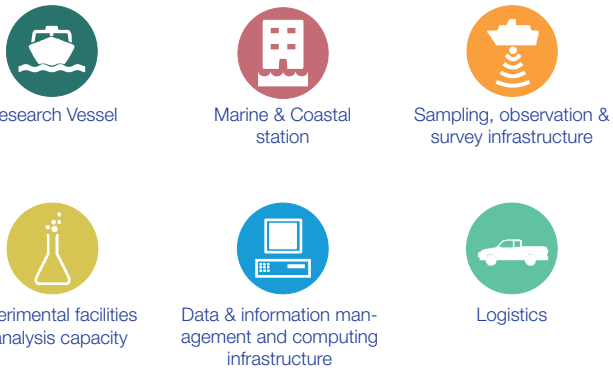
Flanders Marine Institute (VLIZ)

// Website research infrastructure

http://www.vliz.be/en/

// Contact research infrastructure

dr. André Cattrijsse (andre.cattrijsse@vliz.be)



Infrastructure Categories		Infrastructure	
		• Regional vessel: RV Simon Stevin (36 m) (http://www.vliz.be/en/rv-simon-stevin) • RIB Zeekat (http://www.vliz.be/en/rib-zeekat)	
		• Marine Station Ostend (http://www.vliz.be/en/marine-station-ostend)	
	Underwater vehicles, drifters and floats	• ROV Genesis (http://www.vliz.be/en/rov-genesis) • Mini ROV	
	Ship-based instrumentation	*Sampling of marine organisms:* • Bongo net • Beam trawl • Otter trawl • Pelagic otter trawl • Bowers and Connelly multi-corer • Hamon grab • Hydrophone • Hyperbenthic sledge • MIK net • Neuston net • Sieving table • Apstein plankton net • CalCoFi plankton net • Vertical plankton net – WP2 • Plankton pump • Reineck box corer • Van Veen grab • Fish sorting table • Wilson auto-siever • Flow cytometry • Video plankton recorder *Sampling & mapping of the seabed:* • Bowers & Connolly multi-corer • Cohesive Strength Meter (CSM) • Hamon grab • Multibeam sonar • Reineck box corer • Sediment Profile Imaging	• Singlebeam sonar • Van Veen grab • Video frame *Sampling & characterisation seawater:* • Acoustic current meter (ADCP) and speed log • Carrousel 6 x 4 l Niskin bottles • CTD's can be equipped with: - Photosynthetically active radiation (PAR) - Dissolved oxygen - Turbidity - Acidity and oxidation reduction potential (ORP) - pCO2 sensor • Fluorimeter • Go-Flo bottle 10l • Multibeam sonar • Niskin 5 litre bottle • Secchi disc • LISST-100X turbidity meter *Onboard underway data acquisition system:* • Thermosalinograph • Fluorimeter • Surface pCO2 • Oxygen sensor • Turbidity sensor (see http://www.vliz.be/en/equipment)
	Fixed platforms, moorings and landers	• Tripod • Buoy with measurement devices for biological and chemical parameters	
	Field instrumentation	• Fish acoustic receiver network (VEMCO) • Sensor network for large birds • Acoustic porpoise detectors • Underwater camera • USBL system GAPS	

VLIZ

Wandelaarkaai 7
B-8400 Ostend

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	• Multifunctional laboratories in the Marine Station Ostend (wet and dry laboratories) • Molecular laboratory for DNA extraction
	Analysis equipment, services and techniques	• Semi-automatic zooplankton recognition tool (ZooSCAN) • Microscopes
	(Marine) libraries	The VLIZ Library is a public marine scientific information centre. It is the central point of contact for marine information for scientists, policymakers and the public at large (http://www.vliz.be/en/vliz-library). • Approximately 112,000 publications and references • 32,500 publications are disclosed in open access • The compilation of the Belgian Marine Bibliography: currently around 34,000 references of which 85% are available (digital or printed)
	Marine data centres	*VLIZ Data Centre:* • National Oceanographic Data Centre (NODC) • General data management to support Flemish marine research • The development of data systems and technologies (see also http://www.vliz.be/en/datasystems) • International e-infrastructures: LifeWatch, the central portal for the European Marine Observation and Data network (EMODnet), World Register of Marine Species (WoRMS), Global Sea Level Observing System (GLOSS), Ocean Biodiversity Information System (EurOBIS), Marine Regions
		• Compressor for filling diving cylinders • Core repository – cold store for drill cores • Freezers • Underwater diver receiver • Conference rooms and meeting facilities • Delivery van and an off-road vehicle for scientific sampling

Flemish Institute for Technological Research (VITO)

// Website research infrastructure

http://lemon.vgt.vito.be/


Sampling, observation & survey infrastructure


Satellites & (airborne) remote sensing capacity


Data & information management and computing infrastructure


Logistics

Infrastructure Categories		Infrastructure
	Underwater vehicles, drifters and floats	An Unmanned Surface Vessel (USV): Aquadrone (mobile sensor platform)
	Field instrumentation	Several spectroradiometers, sunphotometers, GPS, etc.
		*Platforms, RPAS:* • Fixed Wing "Cruiser": up to 35 kg Maximum takeoff Weight, Payload: 6-10 kg, Wingspan: 380 cm, Length: 280 cm, Endurance: 4-5 hours • Octocopter AT 8: Endurance 7 min with max payload of 1.5 kg • Octocopter AT x8 'zenith': Endurance 15 min with max payload of 3 kg *Platforms, Satellite:* • PROBA-V: a small earth observation satellite for global vegetation monitoring, in operation since December 2013 *Instruments:* • APEX: an airborne (dispersive push broom) imaging spectrometer • LiCrIS – Liquid Crystal based Imaging Spectrometer • Headwall Micro Hyperspec
	Marine data centres	The remote sensing unit of VITO hosts an extensive data centre focused on powerful parallel computing. It serves both internal and external customers. The data centre excels in its state-of-the-art infrastructure, without losing sight of energy efficiency. The VITO-experts are highly committed to achieve advanced image processing via optimised software computing chains on high performance processing clusters. Thanks to the scalable system in place, the institute is able to expand the data centre continuously. The total storage capacity today -on disk- is 1.8 PB. The stable and secure IT environment ensures that the data archived in the data centre is protected effectively against cyber attacks. Crucial data are archived at a number of different locations, which ensures that they have the extra protection required. In the near future it will be possible to process data remotely on demand, i.e. the data remains in the data centre, but the researcher can access the data and perform the processing he/she desires.
		The remote sensing unit has a van equipped for unmanned airborne campaigns

VITO

Boeretang 200
B-2400 Mol

Research Institute for Nature and Forest (INBO)

// Website research group

https://www.inbo.be/en

// Contact research infrastructure

wod.labo@inbo.be


Research Vessel


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
		Boats / RIBs: Pioneer Multi 60 HP
	Overview	
	Type of laboratory / analyses	• Analytical laboratory: presence of nutrients and contaminations in soil, water and tissue samples and physical soil analyses • The molecular-genetic and in-vitro laboratory studies the genetic diversity of populations and species and supports tree breeding as well as the construction of gene banks • The phytopathology laboratory investigates diseases caused by fungi and bacteria • Centre for tree diagnosis
	Aquaculture experimental facilities	Outdoor and indoor aquaculture facilities
	(Marine) libraries	INBO library

INBO

Kliniekstraat 25
B-1070 Brussels

Institute for Agricultural and Fisheries Research (ILVO)

// Website research infrastructure

- http://www.ilvo.vlaanderen.be/NL/Diensten-en-producten
- http://www.ilvo.vlaanderen.be/EN/Services-and-Products


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

// Contact research infrastructure

Hans Polet (Hans.polet@ilvo.vlaanderen.be)

Infrastructure Categories		Infrastructure
	Ship-based instrumentation	• 8 m sampling beam trawl (40 mm) • 6 m survey beam trawl (20 mm) • 4 m survey beam trawl (40 mm) • 8 m twin beam trawl (experimental)
	Field instrumentation	Drone with RGB-camera, hyperspectral camera and thermal camera
	Overview	
	Type of laboratory / analyses	• Several laboratories with a number of analysis tools (ASE, GC-ECD, GC-MS (Ion trap), GC-MS (Quad), HPLC (UV+FL) • Analyses with regard to the marine environment (fishing gear, seawater), sediment, epibenthos, macrobenthos, plankton and fish (http://www.ilvo.vlaanderen.be/Default.aspx?TabID=6539#.VfrQw5f9dYY)
	Class or accreditation	All laboratories work according to the criteria of the NBN EN ISO/IEC 17025 standard
	Analysis equipment, services and techniques	*Design and performance of fishing gear:* • Tension meter: measures the tension in the fishing line with digital recording per second • Underwater camera: high quality video recordings of fishing and other underwater activities • Scanmar, Marport: acoustic equipment for measuring net characteristics during fishing • Pulse generators for electric fishing
	Aquaculture experimental facilities	*Aquaculture research group:* • 18 tanks of 500 l, each with their own recirculation system for general purposes • For feed experiments and survival tests: 11 small (120 l) and 2 large (2,000 l) fish tanks on one recirculation system under controlled light and temperature conditions • 18 small (120 l) fish tanks, each on one recirculation system • 5 large fish tanks (2,000 l) on one recirculation system • Various fish tanks from a few litres up to 3,000 l • Various tanks for fish eggs and larvae with their own recirculation system *Chemical monitoring research group:* • 24 aquaria (60 x 30 x 35 cm – 50 l) available to perform exposure experiments with toxic chemicals *Biological monitoring research group:* • Exposure room with a separate recirculation and cooling system. It contains 16 cilindro-conical tanks (11 l) and 10 small fish tanks (120 l). Either flow-through or recirculation are available. A direct connection to the sea to pump up seawater (stored in a tank of 40 m^3) *Fisheries Technology research group:* • Various recirculation systems for stocking (fish and shrimp) and testing of: 8 medium-sized fish tanks (570 l) and 18 small fish tanks (100 l). This group also has a separate room with its own cooling and recirculation system.

ILVO

Ankerstraat 1
B-8400 Ostend

Infrastructure Categories		Infrastructure
	Marine land-based facilities for engineering	Fisheries Technology research group: A towing tank is available (6.6 m x 1.5 m x 0.7 m (7 m^3))
	Numerical models, specialised software packages and computational infrastructures	DynamiT – simulation fishing gear
	Simulators	Fishing gear simulation (DynamiT)
	Marine data centres	Fisheries data (otolits, catches, discards, effort, VMS, economic, fuel)

Botanic Garden Meise

// Website research group

http://www.plantentuinmeise.be/

// Contact research infrastructure

Prof. dr. Bart Van de Vijver (vandevijver@br.fgov.be)
dr. Piet Stoffelen (piet.stoffelen@br.fgov.be) (***collection manager***)
Mrs. Ann Bogaerts (ann.bogaerts@br.fgov.be) (***collection manager***)

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Molecular lab facilities
	Analysis equipment, services and techniques	JEOL JSM-7100F High Performance FE-SEM
	(Marine) libraries	Library of the Botanic Garden Meise (http://www.plantentuinmeise.be/RESEARCH/LIBRARY/index.php)
	Marine data centres	The Botanic Garden Meise disposes of several databases: http://www.plantentuinmeise.be/RESEARCH/COLLECTIONS/alldatabase.php
	Collections	Conservation: • The Seed Bank • The Seed List • Wild Phaseoleae (Bean) Database Collections: • Plant Herbarium • Non-vascular Cryptogams Herbarium (including Van Heurck collection) • Botanical Illustrations • Living Collections See: http://www.plantentuinmeise.be/CONSERVATION/index.php and http://www.plantentuinmeise.be/RESEARCH/COLLECTIONS/index.php

Botanic Garden Meise

Nieuwelaan 38
B-1860 Meise

Universities & graduate schools of the Wallonia-Brussels Federation

// University of Liège (ULg)
// Université Libre de Bruxelles (ULB)
// Université Catholique de Louvain (UCL)
// University of Mons (UMons)
// University of Namur (UNamur)
// Haute Ecole Paul-Henri Spaak

University of Liège

// Faculty of Sciences

- Animal Ecology and Ecotoxicology laboratory
- Chemical Oceanography unit
- Research unit Clays, Sedimentary Geochemistry and Environments
- Laboratory of Animal Physiology
- Geohydrodynamics and Environment Research group
- Laboratory of Oceanology
- Palaeobiogeology, Palaeobotany and Palaeopalynology laboratory
- Sedimentary Petrology laboratory

// Faculty of Applied Sciences

- Research unit Naval Architecture, Maritime Engineering, Inland and Sea Shipping and Transport System Analysis

// Faculty of Veterinary Medicine

- Department of Morphology and Pathology

Animal Ecology and Ecotoxicology laboratory (ULg)

// Website research infrastructure

http://www.leae.ulg.ac.be/services.html

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	CHR
	Type of laboratory / analyses	• Ecotoxicological lab • Analytical chemistry of organic micropollutants • Farming facilities for marine and freshwater invertebrates
	Analysis equipment, services and techniques	• Analysis of POPs by gas chromatography in various biological and environmental matrices • Measurement of the activity of mono-oxygenase (e.g. EROD-PROD-ECOD) in invertebrates and fish • Proteomic and genomic analysis • Tests acute and chronic toxicity on (*Daphnia magna* and *Brachionus calyciflorus*), benthic crustaceans and molluscs • Technical standard sampling and physicochemical analysis of water in the field and in the laboratory • Determination of invertebrates • Study of incidents in the marine and freshwater environments • Fluorescent stereoscopic microscope, image analyser
	Aquaculture experimental facilities	• Continuous breeding of the following planktonic organisms: *Enterobacter aerogenes, Euglena gracilis, Chilomonas paramecium, Chlorella vulgaris, Dictyoshpaerium ehrenbergianum, Chlamydomonas reinhardtii* • Continuous breeding of freshwater planktonic organisms: *Brachionus calyciflorus* and *Daphnia magna* • Breeding of freshwater amphipods (*Gammarus pulex* and *G. fossarum*) and of freshwater gastropods (*Lymnaea stagnalis* and *Potamopyrgus antipodarum*)

LEAE

Institut de Chimie, B6C
Allée du 6 Août 11
B-4000 Sart-Tilman - Liège

Chemical Oceanography unit (ULg)

// Website research infrastructure

http://www.co2.ulg.ac.be/

// Contact research infrastructure

dr. Alberto Vieira Borges


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure	
	Ship-based instrumentation	*The research group carries out the following analyses (on ships, in the field or in the laboratory):* • Partial pressure of CO_2 (pCO_2) – measurements carried out using an equilibrator designed for coastal environments. This instrument can also be used on buoys and fixed stations. • Dissolved CH_4 concentration by gas chromatography • Dissolved N_2O concentration by gas chromatography • Dissolved N_2O stable isotopes by Off-Axis Integrated Cavity Output Spectroscopy • DMS, DMSP, DMSO by gas chromatography • Colored dissolved organic matter (CDOM) by spectrophotometry • Fluorescent dissolved organic matter (FDOM) by scan-fluorimetry	• Interfacial CO_2 fluxes using the floating chamber method • Interfacial CO_2 fluxes using the automated/autonomous chamber method • Interfacial CO_2 fluxes by eddy-covariance • pH is measured with a combined electrode either continuously or on discrete samples in the field or in the laboratory. • Total Alkalinity (TAlk) is measured by Gran electrotitration. • Dissolved inorganic carbon (DIC) is measured by CO_2 determination on acidified samples • Dissolved oxygen (O_2) is measured on discrete samples by the Winkler method with a potentiometric end-point determination, or, continuously using an optode. • Chlorophyll-a by fluorimetry • NO_3^-, NH_4^+, dissolved silica, phosphate by colorimetry
	Overview	CHR	
	Type of laboratory / analyses	Chemistry laboratory	
	Analysis equipment, services and techniques	• Partial pressure of CO_2 (pCO_2) • Dissolved CH_4 concentration by gas chromatography • Dissolved N_2O concentration by gas chromatography • Dissolved N_2O stable isotopes by Off-Axis Integrated Cavity Output Spectroscopy • DMS, DMSP, DMSO by gas chromatography • Colored dissolved organic matter (CDOM) by spectrophotometry • Fluorescent dissolved organic matter (FDOM) by scan-fluorimetry • Interfacial CO_2 fluxes using the floating chamber method • Interfacial CO_2 fluxes using the automated/autonomous chamber method • Interfacial CO_2 fluxes by eddy-covariance • pH is measured with a combined electrode either continuously or on discrete samples in the field or in the laboratory. • Total Alkalinity (TAlk) is measured by Gran electrotitration.	• Dissolved inorganic carbon (DIC) is measured by CO_2 determination on acidified samples • Dissolved oxygen (O_2) is measured on discrete samples by the Winkler method with a potentiometric end-point determination, or, continuously using an optode. • Chlorophyll-a by fluorimetry • NO_3^-, NH_4^+, dissolved silica, phosphate by colorimetry *Instruments:* • Infra-red gas analyser Li 6252 • Infra-red gas analyser Li 6262 • Infra-red gas analyser Li 840 • Infra-red gas analyser Li 820 • Gas chromatograph SRI for CH_4/N_2O • Gas chromatograph Agilent for DMS(P)(O) • Titrator for total alkalinity • pHmeter field and laboratory • Scan-fluorometer

Chemical Oceanography

Campus du Sart-Tilman, B5
Allée du 6 Août, 17
B-4000 Liège

Research unit **Clays, Sedimentary Geochemistry and Environments** (ULg)

// Website research infrastructure

http://www.ages.ulg.ac.be/pages/equipements.html

// Contact research infrastructure

Joël Otten (j.otten@ulg.ac.be)


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Logistics

Infrastructure Categories		Infrastructure
	Field instrumentation	Coring equipment (gravity corer UWITEC) for short (60 cm) and long (2 m) underwater coring
	Overview	XRD MS
	Type of laboratory / analyses	Sedimentological/mineralogical/isotope labs
	Class or accreditation	A class 100 clean laboratory (FNRS & ULg funding) to dissolve sediments for geochemical elemental analyses (ICP-MS, in collaboration with L. André, RMAC Tervuren) and Nd and Pb isotope analyses (MC-ICP-MS in collaboration with N. Mattielli, G-Time, ULB).
	Analysis equipment, services and techniques	• Preparation of samples for X-ray diffraction on bulk powder and clay aggregates • lyophilise and impregnate soft sediments • Preparation of large thin sections for laser ablation analyses (LA-ICP-MS, in collaboration with L. André, RMAC Tervuren) The analytical equipment comprises: • 2 diffractometers D8 Advance Bruker with theta-theta goniometer and a X-ray Cu tube (i.e., a diffractometer with a punctual detector and an autosampler of 9 positions; diffractometer D8 Advance Eco with a linear detector, an autosampler of 90 positions and an ***in situ*** high temperature chamber for ceramic application, FNRS and ULg funding) • A magnetic susceptibility analyser (Bartington) • Analytical balance • Ovens (40-250°C) and furnace (1200°C) • Centrifuge (50-250 ml, 5000 rpm) • A device for measuring magnetic susceptibility of powder
		Cold room for storage of sediment samples and cores (4°C room)

AGEs

B18, Sart-Tilman
Allée du 6 Août
B-4000 Liège

Laboratory of **Animal Physiology** (ULg)*

// Website research infrastructure

http://www2.ulg.ac.be/physioan/techexp.htm#top

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Analysis equipment, services and techniques	The technical expertise of the group consists of: • Ions fluxes in transport studies • Intracellular ions concentration (Na - K - Cl) • Cell culture • Electron microscopy (scan and transmission) • Intracellular organic osmotic effectors • High pressure technology (up to 1000 Atm) • Time-lapse cinematography

*Content not validated by the research group

Animal Physiology

Sart Tilman
Boulevard du Rectorat 27 (P70)
B-4000 Liège

Geohydrodynamics and Environmental Research group (ULg)

// Website research infrastructure

http://modb.oce.ulg.ac.be/mediawiki/index.php/Software

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Numerical models, specialised software packages and computational infrastructures	*Interpolation:* • DINEOF (Data Interpolating Empirical Orthogonal Functions): a tool for removing missing data in geophysical data sets • DIVA (Data-Interpolating Variational Analysis): a spatial interpolation software • "Diva on web" Diva's web-interface • "OceanBrowser" A web-interface for visualising NetCDF files *Data assimilation:* • Ocean Assimilation Kit: tool kit for ensemble and reduced-order assimilation • Weakly Constrained Ensembles Method to create dynamically constrained ensemble perturbation for ensemble forecasts and data assimilation. • Octave/Matlab toolboxes • Octcdf, a NetCDF toolbox for Octave • Loadgrib, a GRIB decoder for Octave • Optiminterp, Optimal interpolation Fortran module with Octave interface • Filtering inertia-gravity waves from the initial conditions of the linear shallow water equations *Models:* • GHER3D Three dimensional primitive equation model Access to NIC4 and CECI supercomputers

GHER

Campus du Sart-Tilman, B5
B-4000 Liège

Laboratory of **Oceanology** (ULg)

// Website research infrastructure

http://www2.ulg.ac.be/oceanbio/Recherche.htm

// Contact research infrastructure

Prof. Sylvie Gobert (Sylvie.gobert@ulg.ac.be)

Marine & Coastal station

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
		Oceanographic Station STARESO (Calvi, Corsica) - Mediterranean Sea
	Ship-based instrumentation	CTDs, Niskin Bottles, Plankton Nets
	Fixed platforms, moorings and landers	Mooring in front of STARESO: seawater temperature, light probes at different depths
	Field instrumentation	Meteorological stations
	Overview	CHR MS
	Type of laboratory / analyses	• Isotopic analysis of carbon, nitrogen and sulfur in environmental sciences (EA-IRMS and GC-IRMS) • Trace element analysis (ICP-MS; DMA Milestones) • Nutrient analysis in seawater (adapted for oligotrophic waters) (Technicon and Skalar) • In situ mesocosms (Mediterranean Sea)
	Class or accreditation	Aquarium for in vivo expositions - Convention LA 1610430 approved by the Commission d'éthique
	Analysis equipment, services and techniques	• Isoprime 100 mass spectrometer (Isoprime, UK) coupled to an elemental analyser and gas chromatograph and a quadrupole mass spectrometer (Agilent) (EA-GC-C-IRMS-MSD) • DMA Milestones for T-Hg analysis
	Aquaculture experimental facilities	See Affish (Centre de recherche en Ichtyologie Fondamentale et Appliquée), http://www.affish.ulg.ac.be/?q=en/affish_overview
	(Marine) libraries	http://orbi.ulg.ac.be/
	Marine data centres	The 'RACE database': more than 5 million of chemical, biological and physical data records in front of STARESO
	Collections (e.g. for biological resources)	• Weekly zooplankton samples in front of STARESO since 2003 • Marine mammals samples (in collaboration with T. Jauniaux)

Oceanology

Sart-Tilman, B6c
Allée de la Chimie 3
B-4000 Liège

Palaeobiogeology, Palaeobotany and Palaeopalynology laboratory (ULg)

// Website research infrastructure

http://www.facsc.ulg.ac.be/cms/c_1468767/en/home

// Contact research infrastructure

Prof. dr. E. Javaux

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Microscopy, Microspectroscopy and Palynology Laboratory
	Analysis equipment, services and techniques	• Equipment: Micro-Raman spectroscopy, micro-FTIR spectroscopy, chemical lab for organics extraction and palynological preparation, optical microscopy • Services: microfossil identification, biostratigraphy, thermometry of organics, sample preparation and palynological slides from all types of lithologies and ages
	Other experimental facilities and analysis capacity	Access to electronic microscopy platform (ULg catμ), thin sections and polished thin sections (animal paleontology lab)
	Numerical models, specialised software packages and computational infrastructures	Microspectroscopic (Raman and FTIR) database of organics and minerals useful for paleobiology and astrobiology with Renishaw and Bruker softwares
	Collections	Organic microfossil collection of Precambrian (marine) and Palaeozoic (shore and terrestrial) sections (palynological slides)

PPP

Allée du 6 Août, B18
Campus du Sart-Tilman
B-4000 Liège

Sedimentary Petrology laboratory (ULg)

// Website research infrastructure

http://www2.ulg.ac.be/geolsed/servicesUK.htm

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Infrastructure Categories		Infrastructure
	Field instrumentation	Mobile KT-10 magnetic susceptibility meter
	Overview	
	Type of laboratory / analyses	Geological / sedimentological / mineralogical lab
	Analysis equipment, services and techniques	• Manufacturing of thin sections and polished sections • Petrographic analyses and sedimentological (Cathodoluminescence CITL CL Mk5) • Magnetic susceptibility measurements (AGICO KLY-3) • Study of deposits, geological mapping, impact assessment and surveys

Sedimentary Petrology

Sart Tilman, B20
Boulevard du Rectorat, 20
B-4000 Liège

Naval architecture, Maritime engineering, Inland and Sea shipping, Transport System Analysis (ULg)

// Website research infrastructure

- http://www.anast.ulg.ac.be/index.php/en/search/software-developed
- http://www.anast.ulg.ac.be/index.php/en/search/towing-tank-labo

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Marine land-based facilities for engineering	• Towing tank: length: 100 m, height: 6 m, Depth: 4 m • Moving platform (Max speed : 6 m/sec, Length measuring the maximum speed: 30 m, Fully automated and programmable controls, Model up to 4 m) • Wave generator (Generator type component single joint (computer control), Wave type: regular or random, Maximum amplitude waves: 0.4 m, Period : 1 s to 10 s) *Associated equipment:* • 1 component dynamometer balance • 6 components dynamometer balance • Measurement system of self-propulsion • Motion capture with camera • System data acquisition, processing and calculation
	Numerical models, specialised software packages and computational infrastructures	*Several software packages were developed for fluvial and maritime transport:* • AIWAT (fluvial traffic) • ESTIMA (choice of mode of transport) • OLEMSE1 (optimisation of location emergency posts) • OLEMSE2 (optimisation of emergency routes) • WINOLEMSE (integration of OLEMSE1 and OLEMSE2 for Windows) • Traffic management in locks • Traffic management in ports • Economic evaluation of cost/benefits • Market analysis (attractiveness & competitiveness) • Development of software in support of multi-criteria decision • CCT-VEI, (cost of fluvial transport) • Costs of transport of an intermodal transport chain *Software for ship building:* • LBR-5 (optimisation of floating and sailing structures). • LUNAIS (construction of ships)

ANAST

Institut du Génie Civil
(Bat. B52/3; Niv.+1)
Chemin des Chevreuils 1
B-4000 Liège

Department of **Morphology and Pathology** (ULg)

// Website research infrastructure

http://www.marinemammals.be/

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Marine data centres	The Marine Mammals Biobank

Morphology and Pathology

Veterinary College
Sart Tilman B43a
B-4000 Liège

Université Libre de Bruxelles

// Faculty of Science

- Biogeochemistry and Earth System Modelling group
- Laboratory of Ecology of Aquatic System
- Laboratory G-Time
- Glaciology Unit
- Marine Biology unit
- Laboratory of Systems Ecology and Resource Management

// Faculty of Applied Sciences / Polytechnic School

- Acoustics and Environmental Hydroacoustics laboratory

Biogeochemistry and Earth System Modelling group (ULB)*

// Website research infrastructure

http://www.ulb.ac.be/sciences/dste/ocean/

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Logistics

Infrastructure Categories		Infrastructure	
	Ship-based instrumentation	Sampling equipment: • Sediment traps • In-situ pumps (stand-alone pumps) • Niskin bottles	
	Field instrumentation	Field equipment: • Field vehicle • Electricity generator • Compressor (Kaeser) • Sensors (temperature, pH, conductivity, oxygen)	
	Overview	PSA	
	Type of laboratory / analyses	Geochemical lab	
	Class or accreditation	Clean room with class 100 laminar flow hood	
	Analysis equipment, services and techniques	*Analysis of dissolved and particulate major and trace elements:* • Electrothermal Atomic Absorption Spectrometry (ETAAS) with Zeeman correction (SpectrAA Varian) • Inductively coupled plasma atomic emission spectroscopy (ICP-OES) (Liberty Series II Varian) • Chemiluminesence Flow Injection Analysis of Iron *Analysis of elemental carbon and nitrogen:* • Dissolved organic and inorganic carbon analyser (Shimadzu) • Elemental particulate C, N, S analyser (Fisons) *Analysis of nutrients:* • AutoAnalysers (Technicon and Skalar) • UV-Visible spectrophotometer *Radiotracer techniques for biogeochemical studies of the aquatic media:* • Controlled laboratory devoted to radiotracers experiments • Light meter • Incubators (laboratory and for usage on board research vessels)	*Measurement of physico-chemical parameters:* • pH meter • Oxygen meter • Conductivity meter • Alkalinity *Measurement of specific surface area:* • Analyser of particles and porosity (Nova 1000) *Study of suspended matter and sediments:* • Rock grinder • Sieving device • Microwave digestion system for the particulate matter • Decantation column *Miscellaneous laboratory equipment:* • Fluorimeter (Shimadzu) • Computed incubators • Balances (weighing range: 0.01 mg – 5 kg) • Refrigerated centrifuge • Titrators (Metrohm) • Ultrasonic apparatus • UV treatment device • Oven • Furnace up to 1000°C (Vectra)
		Mechanic and electronic workshop	

*Content not validated by the research group

BGéoSys

Campus du Solbosch
CP160/02
avenue F.D. Roosevelt 50
B-1050 Brussels

Laboratory of **Ecology of Aquatic System** (ULB)

// Website research infrastructure

http://esa.ulb.ac.be/equipment/

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Logistics

Infrastructure Categories		Infrastructure	
	Field instrumentation	Field salinometer and pH meter	
	Overview		
	Analysis equipment, services and techniques	*Incubators & culture cabinets:* • Simulated in situ deck incubators equipped with light attenuation filters • Laboratory incubator equipped with light attenuation filters • Photosynthetron (CHPT) • Thermoregulated cabinets • Thermoregulated illuminated culture room • Thermoregulated light cabinets (-20°C - +60°C) (Rumed GMBH) • Rolling device for aggregate formation • Sedimentation column (SEDCOL) • Incubators for the study of biofilms in water supply networks *Optical instruments:* • Spectrophotometer (Lambda 650S) equipped with integrated sphere (Perkin Elmer) • Fluorometer with integration sphere (Kontron) • Fluorometer LS 55 (Perkin Elmer) • Spherical microquantameter US-SQS/LI (Walz) • Atmospheric and underwater light sensors (Li-COR) • Profiling Natural Fluorometer System PNF-300 (Biospherical Instruments) • Light absorption and attenuation sensor AC9 (WET-Labss) • Pulse Amplitude Modulated (PAM)Fluorimeter (Walz) *Microscopy:* • Inverted microscope (Leica)	• Epifluorescence microscope (Leitz) • Digital camera (Nikon) • Digital image analyser (Lucia 4.6) *Molecular biology:* • DGGE Dcode-Kit (Biorad) • Thermocycler (Eppendorf) • Transilluminator UV HI/LO 302 nM 20 x 20 • Electrophoresis system mini-gel (I-MUPID) • Laminar flow hood RNA/DNA (Biocap) • QPCR (Applied Biosystem) *General equipment:* • Liquid scintillation counter (Packard) • High temperature furnace (HC) • Autoclave (Systec 3870) • Laminar flow hood (ADS) • Laminar flow hood (CLF 475) • Ultra pure water system (MilliQ) • Thermoregulated centrifuge (Sigma) • Thermostatic bath (Polyscience) • Rotating table (Vel) • Filtration systems (Millipore) • Manifold filtration system for microbiological analysis • Vacuum/Pressure Pumps (Millipore) • Peristaltic pump (Vel) • Thermos bottle for liquid nitrogen (Locator) • Ultrasonics bath and probe (Labsonic) • Marine snow catch bottle (prototype)
		-80°C deep freezer	

ESA

Campus de la plaine, CP221
Boulevard du triomphe,
B-1050 Brussels

Laboratory **G-Time** (ULB)

// Website research infrastructure

- http://gtime.ulb.ac.be/Services.html
- http://gtime.ulb.ac.be/Facilities.html

Experimental facilities
& analysis capacity

// Contact research infrastructure

dr. Nadine Mattielli (nmattiel@ulb.ac.be)

Infrastructure Categories		Infrastructure
	Overview	MS
	Type of laboratory / analyses	Geochemical lab
	Class or accreditation	3 class 100 and 1 class 1000 clean labs for preparation (acid digestion and ion chromatography) and chemical analysis: major, minor and trace elements
	Analysis equipment, services and techniques	*Services:* • Analysis of isotopic compositions by MC-ICP-MS of Pb, Nd, Hf, Cu, Zn, Fe. Measurements can be performed in wet plasma and in dry plasma. • Sample preparation for Sr isotopic analysis *Instruments:* • 2 High resolution multiple collector - inductively coupled plasma - mass spectrometry (MC-ICP-MS-HR) (Nu Plasma) for isotopic measurement (Pb, Lu/Hf, Nd/Sm, Fe, Mg, Cu, Zn, Cd) • 1 Thermo TIMS (Triton) • Dessolvating systems (DSN-100, Cetac Aridus II, Apex) • Quadrupole inductively coupled plasma - mass spectrometry (ICP-MS) Agilent 7700 for trace element analyses • I-Cap for major element analyses

G-Time

Campus du Solbosch
CP160/02
Avenue F.D. Roosevelt 50
B-1050 Brussels

Glaciology unit (ULB)

// Website research infrastructure

http://dev.ulb.ac.be/glaciol/lab.html

Experimental facilities & analysis capacity

Logistics

Infrastructure Categories		Infrastructure
	Overview	CHR
	Type of laboratory / analyses	Glaciological lab
	Class or accreditation	Class 100 clean room for measurements of trace metals in melted ice samples
	Analysis equipment, services and techniques	• Pneumatic compression apparatus for high precision uniaxial compression tests • Ion chromatograph for measurements of major anions (Cl^-, SO_4^{2-}, NO^{3-}, etc.) • Precision diamond wire saws for cutting ice samples • Band saw for ice cutting • Microtome for the thickness reduction of ice thin sections and precise chemical ice sampling • Toepler extraction pump for measurement of total gas content in the ice • Gas Chromatographs (GC) for measurement of the gas composition in CO_2, O_2, N2, Ar, CH_4 and DMS in ice • Automatic Fabric Analyzer (AFA): G 50 Instrument • Crusher for dry extraction of gasses from the ice • Universal stage for the measurement of the C-axis orientation of ice crystals • Flame atomic absorption spectrometer for measurement of major cations (Na^+, K^+, Mg^{2+}, Ca^{2+}, etc.)
		Two cold rooms (0°C to -30°C) for ice samples cutting and treatment

Glaciology

Campus du Solbosch
CP160/03,
Avenue F.D. Roosevelt 50
B-1050 Brussels

Marine Biology unit (ULB)

// Website research group

http://biomar.ulb.ac.be/


Research Vessel


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure


Logistics

Infrastructure Categories		Infrastructure
		RIB: Zodiac Mark II, 40hp
	Underwater vehicles, drifters and floats	MicroROV: Videoray pro 3 GTO-XE (150 m depth grade, observation class ROV)
	Field instrumentation	Basic field instruments, including e.g.: GPS, Salinometer, pH-meters, VHF, etc.
	Overview	
	Type of laboratory / analyses	Ecotoxicology lab: trace metals analysis
	Analysis equipment, services and techniques	• Microscopy (electronic and photonic) and image analysis facility • Biochemistry, enzymology • Acid-base physiology • Cell culture and microbiology • Larvae rearing
	Aquaculture experimental facilities	• Controlled temperature/pH aquariology setup • Large aquaria facility (3x1,000 l) for maintenance of marine organisms
	Numerical models, specialised software packages and computational infrastructures	• Specialised Software: ArcGIS, R (incl. custom scripts, Mothur, Q-GIS, Genetics analysis) • Modelisation: Dynamic Energy Budget models (DEB), Species Distribution Models (SDM) • Supercomputing: access to Hydra for intense calculation (e.g. Mothur pipelines) (https://cc.ulb.ac.be/hpc/)
	(Marine) libraries	CIBIM database (11k+ references on Echinoderms) - digitisation in progress with VLIZ
	Collections	Starfish reference collection, various field samples collection
		Scuba diving (including in Polar regions)

BIOMAR

Campus du Solbosch, UC5. 230
CP160/15,
Avenue F.D. Roosevelt 50
B-1050 Brussels

Research unit **Systems Ecology and Resource Management** (ULB)

// Website research group

www.ulb.ac.be/sciences/biocomplexity/

Sampling, observation & survey infrastructure

Satellites & (airborne) remote sensing capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	Vegetation and environmental analyses
		Hardware and software
	Collections	Mangrove Reference Database and Herbarium (http://www.vliz.be/vmdcdata/mangroves/)

Systems Ecology and Resource Management

Campus du Solbosch, CPI 264/1
Avenue F.D. Roosevelt 50
B-1050 Brussels

Acoustics and Environmental Hydroacoustics laboratory (ULB)

// Website research infrastructure

http://ehl.ulb.ac.be/index.html

// Contact research infrastructure

Prof. dr. Jean-Pierre Hermand

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Underwater vehicles, drifters and floats	In partnership EHL custom equipment
	Ship-based instrumentation	EHL custom equipment
	Fixed platforms, moorings and landers	EHL custom seafloor frames for acoustic and oceanographic observations
	Field instrumentation	• Range of underwater acoustic transducers, control and data acquisition systems (EHL custom) • Range of oceanographic sensors and autonomous data loggers • Range of satellite-based positioning and timing systems
	Type of laboratory / analyses	• Ultrasound lab • Sedimentology lab (in partnership) • Electronics lab
	Analysis equipment, services and techniques	In partnership
	Other experimental facilities and analysis capacity	Underwater acoustic testing
	Numerical models, specialised software packages and computational infrastructures	• EHL custom acoustic propagation modelling and inversion; signal and image processing • EHL-owned high-performance workstations • HYDRA ULB & VEGA CECI clusters

EHL

Av. Fr. Roosevelt 50, CP 165/57
B-1050 Brussels

Université Catholique de Louvain

// Science and Technology Sector

- Applied Mechanics unit
- Earth and Life Institute - Environmental Sciences
- Lemaître Centre for Earth and Climate Research
- Institute of Life Sciences
- Marine Biology laboratory

Applied Mechanics unit (UCL)*

// Website research infrastructure

http://www.uclouvain.be/en-mema.html

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Numerical models, specialised software packages and computational infrastructures	• Gmsh: a three-dimensional finite element mesh generator with built-in pre- and post-processing facilities • MAdLib: an open source Mesh Adaptation Library • Second-generation Louvain-la-Neuve Ice-ocean Model (SLIM)
	(Marine) libraries	Bibliothèque Euler (http://www.uclouvain.be/376388.html)

*Content not validated by the research group

MEMA

Avenue Georges Lemaître, 4
Building Euler
B-1348 Louvain-la-Neuve

Earth and Life Institute - **Environmental Sciences** (UCL)*

// Website research infrastructure

http://www.uclouvain.be/36521.html#Bois

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	PSA XRD CHR 
	Analysis equipment, services and techniques	The physico-chemical analysis of soil, water and plants • Solid phase analysis (soil, rock and sediment): optical microscopy, X-ray diffraction, total analyses (plasma emission spectrometry, atomic absorption spectrometry), measurements of physical and chemical characteristics (e.g. grain size, cation exchange capacity, organic matter content, etc.) • Liquid phase analysis: mineral analysis (plasma emission spectrometry, atomic absorption spectrometry, ion chromatography, potentiometry), analysis of organic material (carbon analyser, ion chromatography), speciation (ion chromatography, spectrophotometry), measurement of properties (potentiometry) Anatomical identification of wood and woody species
	Numerical models, specialised software packages and computational infrastructures	The development and use of Geographic Information Systems (GIS)
	Collections	A xylotheque comprising roughly 3.000 temperate and tropical species

***Content not validated by the research group**

Evironmental Sciences (ELI)

Université catholique de Louvain
Croix du Sud, 2 bte L7.05.16
B-1348 Louvain-la-Neuve

Lemaître Centre for Earth and Climate Research (UCL)*

// Website research infrastructure

http://www.uclouvain.be/en-320337.html

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Numerical models, specialised software packages and computational infrastructures	*Climate models:* • LOch–Vecode-Ecbilt-CLio-agIs Model (LOVECLIM) • Java Climate Model (JCM) • The Unified Model (UM) *Ocean and sea ice models:* • Louvain-la-Neuve sea Ice Model (LIM) • Second-generation Louvain-la-Neuve Ice-ocean Model (SLIM) • Constituent-oriented Age and Residence time Theory (CART)

*Content not validated by the research group

TECLIM

Chemin du Cyclotron 2
(Buiding Marc de Hemptinne, tour B, 4th floor)
B-1348 Louvain-la-Neuve

Institute of **Life Sciences** (UCL)

// Website research infrastructure

http://www.uclouvain.be/en-272007.html

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	CHR MS
	Type of laboratory / analyses	Molecular biology lab and aquaculture facilities
	Analysis equipment, services and techniques	• DNA sequencing • Cell culture (fish, mammals) • Transcriptomics (Agilent microarray platform) • Proteomic and protein analysis by mass spectrometry (MASSPROT) (ThermoScientific LTQ XL linear ion trap mass spectrometer and Applied Biosystems 4800 MALDI-TOF-TOF (“matrix-assisted laser desorption ionization – Time of flight”) mass spectrometer) • Confocal and atomic force microscopy • Chemical analysis of small molecules (fatty acids, vitamins, PCBs) (HPLC, GC-FID, GC-MS, UPC^2)
	Aquaculture experimental facilities	Platforme technologique et didactique en biologie aquicole Marcel Huet (specific infrastructure with cold and hot water, open circuit and closed circuit with digestion cages)

ISV

Place Croix du Sud 2
B-1348 Louvain-la-Neuve

Marine Biology laboratory (UCL)

// Website research group

http://sites.uclouvain.be/sc-bmar/

// Contact research infrastructure

Prof. dr. Jérôme Mallefet

Experimental facilities
& analysis capacity

Infrastructure Categories		Infrastructure
	Overview	
	Analysis equipment, services and techniques	• Luminometers • Epi-fluorescent microscopes • Intensified video camera • Video-imaging analysis software (noldus)

BMAR

3 place Croix du Sud, bt L7.06.04
Building Kellner, floor D-1 (ground floor)
B-1348 Louvain-la-Neuve

University of Mons

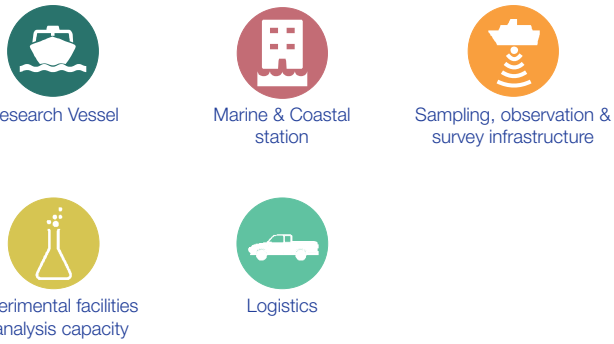
// Faculty of Science

- Laboratory of Biology of Marine Organisms and Biomimetics
- Numerical Ecology of Aquatic Systems group

Laboratory of **Biology of Marine Organisms and Biomimetics** (UMons)

// Website research infrastructure

- http://portail.umons.ac.be/FR/universite/facultes/fs/services/institut_bio/biologie_marine/Pages/Portailmicroscopieelectronique.aspx
- http://hosting.umons.ac.be/php/biomarine/
- www.polyaquaculture.mg/



Infrastructure Categories		Infrastructure
		3 boats in Madagascar (For 7, 7 and 3 persons)
		Field laboratory in Madagascar Tuléar
	Ship-based instrumentation	Scuba diving services in Madagascar
	Overview	
	Type of laboratory / analyses	• Classical histology • SEM, TEM • Sequencing and phylogenetic inference methods • Metaproteomic, metagenomic
	Aquaculture experimental facilities	In Madagascar: Polyaquaculture Research Unit (www.polyaquaculture.mg/) + 100 m² of ponds and other facilities
		4-wheel drive in Madagascar

BOMB

Avenue du champ de Mars 6
B-7000 Mons

Numerical Ecology and Aquatic Systems group (UMons)

// Website research infrastructure

http://econum.umons.ac.be

// Contact research infrastructure

Prof. dr. Philippe Grosjean (Philippe.Grosjean@umons.ac.be)
Antoine Batigny (Antoine.Batigny@umons.ac.be) (***Logistics***)

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Marine chemistry lab (pH, pCO_2, alkalinity, DIC, Ca, Mg, NO_3, NO_2, NH_3, PO_4). Automatic titrators, Li/Cor IRGA, and Seal AA3.
	Analysis equipment, services and techniques	MiniPAM, imaging PAM
	Aquaculture experimental facilities	• Four 1-2 l prototypes of a new kind of chemostat. These original experimental devices, which are being patented (U.K. patent application number 1112269.4), allow us to maintain and study coral holobionts in both controlled and monitored environmental conditions. • Two identical mesocosms of 1,500 l each. They are made of a main tank of 500 l to grow mother colonies, of two times two experimental aquaria of 300 l each that can be disconnected from the main water circuit to study coral frags in different physico-chemical conditions, and of complete filters: mecanical, biological, skimmer and chemical (calcreactors). The systems are completed with “refugia” where macroalgae are cultured to regulate nitrogen and phosphorus concentrations in the water, down to submicromolar values.
	Numerical models, specialised software packages and computational infrastructures	• Development of a software called Zoo/PhytoImage which targets the creation of plankton space-time ecological series by automating a part of the process of the samples. This open source software allows to analyse various kinds of digital plankton images (micro- or macrophotographies, scanned images, or pictures acquired using a FlowCAM). • Development of specialised packages for R, like PASTECS, (Package for the Analysis of Space-Time Ecological Series) • Development of SciViews, which provides a graphical user interface for easier use of R.

ECONUM

Pentagone 3D08
Avenue du Champ de Mars 6
B-7000 Mons

University of Namur

// Faculty of Sciences

- Research unit in Environmental and Evolutionary Biology

Research unit **in Environmental and Evolutionary Biology** (UNamur)*

// Website research infrastructure

http://www.unamur.be/sciences/biologie/urbe/services.html

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	Techniques for the sampling of fish communities (electric fishing nets)
	Overview	CHR
	Analysis equipment, services and techniques	• Routine sampling and analysis of water (field and laboratory), use of radiotracer techniques • Centrifugation (e.g. fractionation by density gradient) • Liquid Chromatography (HPLC), Gas Chromatography (GC) and electrophoresis • Elemental analysis (CHN) • Perfusion of gills • Isolation of cells and cell cultures • Scintillation counter (beta radiation) • Spectrophotometry • Fluorimetry
	Aquaculture experimental facilities	• Experimental closed circuit infrastructure for fish, crustaceans and amphibians (eco-physiology, endocrine disruption and aquaculture) • Semi-industrial open breeding facilities • Indoor breeding facilities (greenhouse) • Associated breeding facilities in Rwanda
	(Marine) libraries	• Online key for the determination of benthic macro-invertebrates • Several magazine subscriptions (http://www.unamur.be/sciences/biologie/urbe/revues)

*Content not validated by the research group

URBE

Rue de Bruxelles 61
B-5000 Namur

Haute École Paul-Henri Spaak

// Paramedical department

- Environmental, Occupational Physiology (Integrative) laboratory

Environmental, Occupational Physiology (Integrative) laboratory

// Website research group

http://www.he-spaak.be/he-spaak/recherche/unites.html

// Contact research infrastructure

Prof. Constantino Balestra (balestra@daneurope.org)

Sampling, observation & survey infrastructure

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	Every data acquisition system is always portable and adaptable in order to be able to analyse and acquire data in hostile, and remote environments.
	Type of laboratory / analyses	Every Human Based Physiological-Medical transportable system: Neurophysiological, Respiratory, Cardiac, Echographic, Echocardiographic, Basic blood analysis (Capillary samples: Glucose, Hematocrit, Hemoglobin, Lactate, etc.), Psychometry, anthropometry, Body composition, etc.
	Analysis equipment, services and techniques	• Cardiorespiratory analysis systems (telemetry, Cyclo-ergometer, treadmill, etc.) • 2 non-transportable ultrasound system • 7 portable ultrasound system • Infrared Cabin • Climate room • Immersion tank • Fitness analysis • Heart Rate variability • Neurophysiological analysis including autonomic nervous system • Bioimpedencemetry, Multifrequency and body composition analysis • Anthropometry • Etc.
	Numerical models, specialised software packages and computational infrastructures	• Fractal and statistical analysis • Automatic measurement of ultrasound images • Neuropsychological analysis
	Marine data centres	• Divers Alert Network database • An in-house dedicated Physiological Diving Bubble related analysis database

Environmental, Occupational Physiology Laboratory

Avenue Charles Schaller, 91
B-1160 Auderghem

Federal Scientific Institutes

// Royal Belgian Institute of Natural Sciences (RBINS)

- Operational Directorate Earth and History of Life
- Operational Directorate Taxonomy and Phylogeny
- Operational Directorate Natural Environment

// Royal Museum for Central Africa (RMCA)

- Biology Department
- Earth Sciences Department

Operational Directorate **Earth and History of Life** (RBINS)*

// Website research infrastructure

https://www.naturalsciences.be/en/science/do/547/scientific-research/laboratories/94

// Contact research infrastructure

Sophie Decree (sdecree@naturalsciences.be)
Thierry Leduc (thierry.leduc@naturalsciences.be)


Sampling, observation & survey infrastructure


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Field instrumentation	Field magnetic susceptibility equipment (Bartington MS3)
	Overview	
	Type of laboratory / analyses	• A meteorite laboratory • A microbotany laboratory • A microvertebrates laboratory • Bio Arch ID Laboratories
	Analysis equipment, services and techniques	• Fossil preparation and casts tools • Optical microscopy • Rock preparation equipment (Fritsch crusher, Fritsch planetary mill and McCrone micronising mill) • Thermal conductivity Scanning (Lippman&Rauen Optical scanning method) • Environmental scanning electron microscope (ESEM, FEI), with Energy Dispersive Spectroscopy (EDS), Wavelength Dispersive spectroscopy (WDS) and Electron backscatter diffraction (EBSD) (EDAX equipment) • Raman microspectrometer (Brücker Senterra) • X-ray diffractometer (XRD, PANanlytical Empyrean) • Gamma rays spectrometry equipment (GF Instruments Gamma Surveyor) • Magnetic laboratory station (AGICO MFK1-A Spinner Kappabridge + CS-3 High temperature furnace module +CSL Low temperature cryostat module)
	(Marine) libraries	Scientific library of the RBINS (https://www.naturalsciences.be/en/science/museum-library)
	Marine data centres	Maintenance of a data base (GeoDoc) with information about the Belgian subsoil.
	Collections	Collections of the RBINS (http://www.naturalsciences.be/science/collections): *inter alia* a Mineralogy collection

***Content not validated by the research group**

OD Earth and History of Life

Vautierstraat 29
B-1000 Brussels

Operational Directorate **Taxonomy and Phylogeny** (RBINS)*

// Website research infrastructure

http://darwin.naturalsciences.be/

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	
	Type of laboratory / analyses	Molecular Systematics Laboratory
	Analysis equipment, services and techniques	• Molecular techniques in the fields of systematics, population genetics and phylogeny, including DNA barcoding and new generation DNA sequencing (NGS) • Computed tomography • Species distribution modelling • Scanning electronic microscope for biological preparations
	(Marine) libraries	Scientific library of the RBINS (https://www.naturalsciences.be/en/science/museum-library)
	Marine data centres	Darwin database (main management tool for the RBINS' scientific collections)
	Collections	• Collections of fishes, amphibians, reptiles, birds and mammals • Entomological and arachnological collections (The Insect Collections contain more than 15,000,000 specimens) (http://www.naturalsciences.be/science/collections)

*Content not validated by the research group

OD Taxonomy and Phylogeny

Vautierstraat 29
B-1000 Brussels

Operational Directorate **Natural Environment** (RBINS)

// Website research group

http://odnature.naturalsciences.be/home/


Research Vessel


Sampling, observation & survey infrastructure


Satellites & (airborne) remote sensing capacity


Experimental facilities & analysis capacity


Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure	
		• RV Belgica (regional vessel) (http://odnature.naturalsciences.be/belgica/nl/) • RIB Tuimelaar	
	Ship-based instrumentation	• Fisheries laboratory • A wet laboratory for the distribution and prior treatment of the samples • Chemistry laboratory • Biochemistry laboratory • Microbiology laboratory *CTD equipment:* • Sea-Bird SBE19 CTD (2x) • Sea-Bird SBE9plus CTD (2x) • Sea-Bird SBE21 thermosalinograph (2x) *Water sampling equipment:* • Sea-Bird model 32 carousel for 12 10 liter Niskin bottles (2x) • Various Niskin and Go-Flo water sampling bottles *Sediment sampling equipment:* • Boxcorer NIOZ model • Van Veen grab, Reineck corer • Bowers & Connelly multicorer *Biological sampling equipment:* • Benthic sledge • High speed encased Gulfstream Plankton sampler • 3 m trawl with shrimp net	*Depth measuring equipment:* • Kongsberg EM3002D shallow water multibeam echosounder system • Kongsberg EA400 with 33, 38 and 210 kHz transducer • Auxiliary sensors: Seatex MRU5 motion sensor, Valeport miniSVS sound velocity sensor, Applied Microsystems SVplus sound velocity profiler *Seawater current measurements:* • Hull mounted Teledyne RDI ADCP model Workhorse Mariner 300 kHzn Teledyne RDI ADCP model • Workhorse sentinel 1,200 kHz for deployment on tripod or TRBM (trawl resistant Bottom Mount) • Valeport model 106 velocimeter *Autonomous Underway Measurement System (AUMS):* • Parameters measured by the AUMS: turbidity, oxygen, pH, chlorophyll, blue algae, CDOM, salinity, pCO_2, fluorescence, Par, hyperspectral irradiance, NO_3, NH_3, PO_4, SiO_2 and NO_2
	Fixed platforms, moorings and landers	Up to three tripods equipped with measuring instruments can be deployed from the RV Belgica. The available instruments are: SonTek Acoustic Doppler Velocimeter ADVOcean 5 MHz, SonTek ADP 3 MHz acoustic Doppler profiler, Sea-Bird SBE37 CT system, Campbell Scientific OBS-3+ turbidity sensor, Nortek Aquadopp current profiler, Sequoia Scientific LISST-100X (Laser In-Situ Scattering and Transmissometer), Aquascat 1000 ABS (Acoustic Backscatter System)	
		• Airplane: Britten Norman Islander for airborne surveillance of the North Sea • Processing of satellite imagery of various sensors: e.g. NOAA AVHRR, SeaWiFS, MERIS, MODIS, CHRIS.	

OD Nature

Vautierstraat 29
B-1000 Brussels

Infrastructure Categories		Infrastructure
	Overview	CHR MS
	Type of laboratory / analyses	Physico-chemical lab
	Class or accreditation	ISO-17025 certified
	Analysis equipment, services and techniques	• Autoanalysers for nutrients, DOC, DP, DN • Elementanalyser for POC, POP • High performance liquid chromatography (HPLC) chain for pigment analysis and sample preparation • Salinometer for salinity measurements • Gas chromatograph - mass spectrometer (GC-MS) and GC system for organic compounds • Various auxiliary equipment for sample preparation, ultra-pure water, analytical gasses
	Numerical models, specialised software packages and computational infrastructures	Various mathematical models dealing with physical variables (water levels, currents, waves, temperature, salinity), chemical variables (mainly substances such as hydrocarbons) and biological variables (confined to the first links in the food chain). *Operational models:* • Hydrodynamic model (currents & height of sea surface) • Distribution of waves in the North Sea • Movement, spreading and physical and chemical development of pollutants on the surface of the sea *Models under development:* • Hydrodynamics (currents, fronts, turbulence, interactions with the atmosphere) • Sediment transport • Marine ecosystem modelling
	(Marine) libraries	Scientific library of the RBINS (https://www.naturalsciences.be/en/science/museum-library)
	Marine data centres	National Oceanographic Data Centre (BMDC): primarily data of the continental shelf and the Scheldt Estuary • Real-time data acquisition system 'ODAS' (Oceanographic Data Acquisition System) • Data on the quality of the marine environment (IDOD, Integrated Dynamical Oceanographic Data Management) • Data catalogues (e.g. an inventory of Belgian marine research projects and an inventory of sets of Belgian data on the marine environment)
	Collections	Collections of the RBINS (http://www.naturalsciences.be/science/collections)

Biology department (RMCA)*

// Website research group

http://www.africamuseum.be/

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	(Marine) libraries	RMCA's library (http://www.africamuseum.be/research/libraries)
	Marine data centres	A subset of FishBase with all data about African brackish water and freshwater fishes (http://www.fishbaseforafrica.org/)
	Collections	Extremely varied collections mainly come from DR Congo, but also from other countries of the African continent (http://www.africamuseum.be/collections). It concerns ***inter alia***: • Coelenterata: 2,410 lots of specimens, 538 species • Crustacea: 58,000 lots of specimens, 1,114 species including 5,500 identified, most of them in alcohol • Echinodermata and other groups of marine animals: over 500 species • Mollusca : ± 20,000 lots of specimens, 5,500 species, in alcohol • The largest collection of fresh- and brackish water fishes from Africa in the world 750,000 specimens

*Content not validated by the research group

RMCA

Leuvensesteenweg 13
B-3080 Tervuren

Earth Sciences department (RMCA)*

// Website research infrastructure

http://www.africamuseum.be/research/earth-sciences/geochemistry/services

Experimental facilities & analysis capacity

Data & information management and computing infrastructure

Infrastructure Categories		Infrastructure
	Overview	MS
	Type of laboratory / analyses	• Geochemistry lab (in collaboration with the ULB and VUB) • Atmosphere-controlled chemical laboratories
	Analysis equipment, services and techniques	• Laser Ablation-Inductively Coupled Plasma-Mass Spectrometer • Nu Plasma Multi-Collector Inductively Coupled Plasma Mass Spectrometer (MC-ICP-MS) • A double focusing magnetic sector field Inductively Coupled Plasma Mass Spectrometer (SF-ICP-MS) • Thermal Ionisation Mass Multi-collector Spectrometer (Sector 54)
	(Marine) libraries	RMCA's library (http://www.africamuseum.be/research/libraries)
	Collections	Extremely varied collections mainly come from DR Congo, but also from other countries of the African continent (http://www.africamuseum.be/collections).

***Content not validated by the research group**

RMCA

Leuvensesteenweg 13
B-3080 Tervuren