

RESEARCH

AT THE UNIVERSITÉ DE BRETAGNE OCCIDENTALE



L'Université
est
une
chance



18 000 students
700 researchers
37 laboratories
Spread across 6 locations in Brittany

Morlaix
Brest
Saint-Brieuc
Quimper
Vannes
Rennes
Paris

RESEARCH POLICY

BY PASCAL GENTE
VP Research

The Université de Bretagne Occidentale aims to promote its research activity on the basis of academic excellence and national and international recognition by building upon scientific developments, innovating and transmitting knowledge, and emphasising the quality of education it provides.

Through collaborations with different Breton partnerships, the Université de Bretagne Occidentale demonstrates its capacity to pool skills in order to develop cutting-edge research in Brittany.

UBO is a remarkable multidisciplinary pool with national and internationally renowned research, spread between 37 research units, 16 of which are associated with major organizations, such as CNRS (Centre national de la recherche scientifique) [National Center for Scientific Research], INSERM (Institut national de la santé et de la recherche médicale) [National Health and Medical Research Institute], IRD (Institut de recherche pour le développement) [Research Institute for Development] and IFREMER (Institut français de recherche pour l'exploitation de la mer) [French Institute for the Exploitation of the Sea].

Research is structured according to four major hierarchical scientific fields:

- 1 Marine Sciences
- 2 Health and Agro-environment, Materials
- 3 Maths-STIC [Science and Technology for Information and Communication]
- 4 Humanities and Social Sciences

Each sector is coordinated by organizational structures allowing for the collaboration of teams and thus the creation of innovative projects founded upon interdisciplinary approaches.

UBO's research integrates with that of local Schools of Engineering (Télécom Bretagne, ENI Brest [Brest National School of Engineering], ENSTA Bretagne [National School of Advanced Techniques], École Navale [French Naval Academy], ISEN [Higher Institute for Electronics and Digital Training] as well as with that of research organizations, some of which have large nearby centres, such as IFREMER.

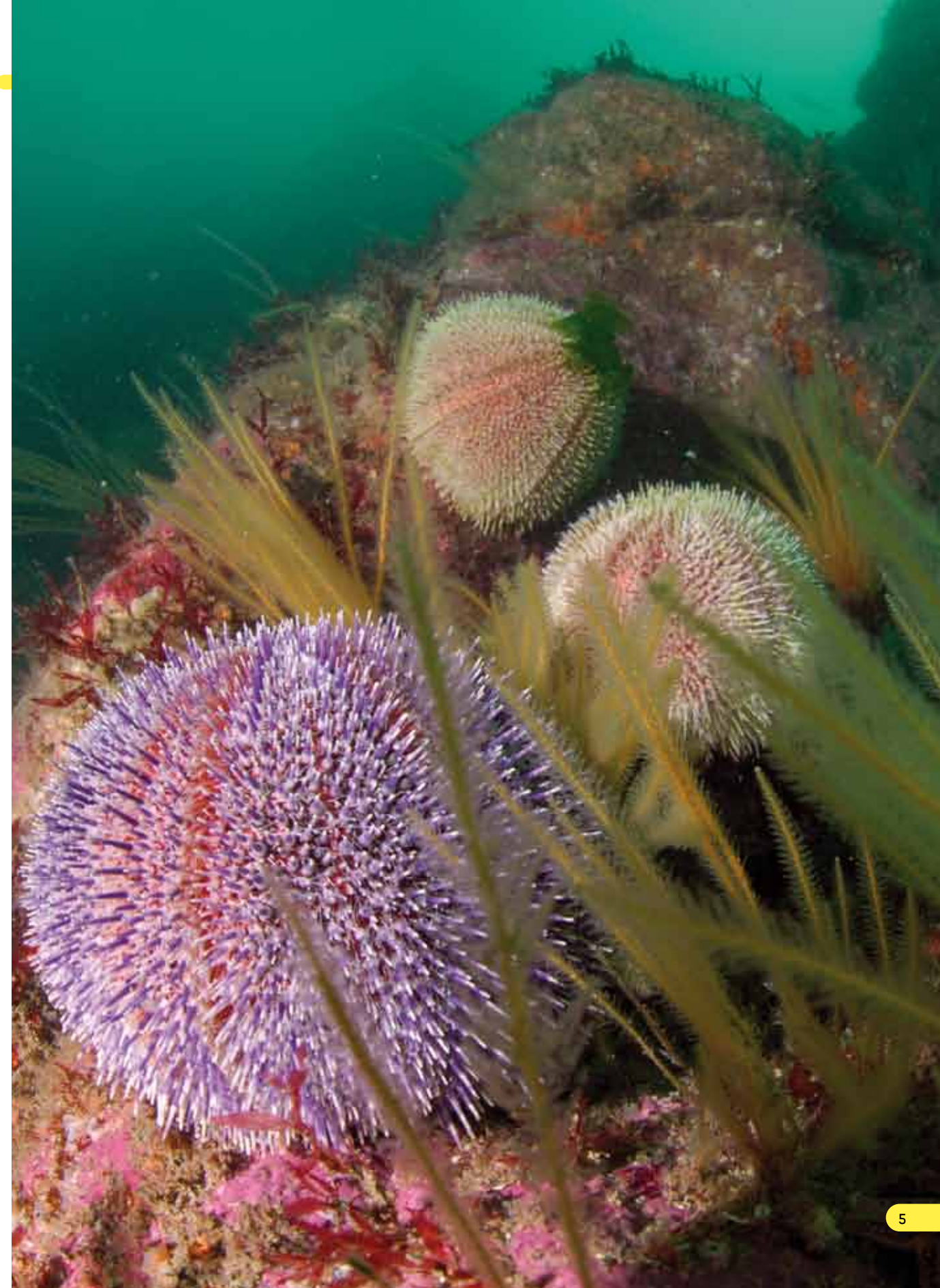
UBO is involved with both local competitiveness clusters such as VALORIAL, and globally-operating ones like MER [The Sea], IMAGES ET RÉSEAUX [Images and Networks], and AUTOMOBILES DE HAUT DE GAMME [High-end Vehicles].

OVERVIEW: 4 MAJOR RESEARCH FIELDS

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SEA	HEALTH	MATHS-STIC	HUMANITIES AND SOCIAL SCIENCES
Earth Sciences Biology Microbiology Chemistry Physics Geography Law, Economics Mechanics	Biology Microbiology Chemistry And several other health fields	Physics Mathematics Electronics Computer Science Telecom Engineering	Education History Sociology Psychology Language and Literature Law Management Ethnology Urban Planning
9 LABORATORIES With OSU, UMR, EA 5 affiliated with CNRS 4 at IFREMER 2 at IRD 1 at the Université de Nantes 1 at the Université d'Angers 1 at the Université de Rennes 2 1 at the Université de Caen 1 at ENIB 1 at ENSTA Bretagne	14 LABORATORIES With FED and UMR 3 affiliated with INSERM 1 affiliated with CNRS 1 at the Université de Bretagne Sud 1 at the Université de Rennes 2 1 at the Université de Rennes 1 1 at ENS Rennes 1 at Télécom Bretagne 1 at EFS (Etablissement français du sang) [French Blood Bank]	3 LABORATORIES 2 affiliated with CNRS 1 at ENSTA 1 at Télécom Bretagne 2 at the Université de Bretagne Sud 1 at ENIB	13 LABORATORIES 1 affiliated with CNRS 1 at Télécom Bretagne 2 at the Université de Bretagne Sud 1 at the Université de Nantes 3 at the Université de Rennes 2
Doctoral College of Marine Sciences	Doctoral College of SICMA (Health, Information, Communication, Mathematics and Matter)		Doctoral College of ALL (Arts, Literature and Languages) Doctoral College of SHS (Humanities and Social Sciences) Doctoral College of SHOS (Anthropology, Human, Organizational and Social Sciences)
Marine Sciences Master in Research	Science, Technology and Health Master in Research		Master in Research in: Art, Languages and Humanities, Human and Social Sciences Law-Economics-Management Science Technology and Health
FUTURE PROJECTS			
Labex MER EQUIPEX NAOS	Labex IGO	Labex COMIN LABS	
		Labex CAMI	

OSU: Observatoire des Sciences de l'Univers [Observatory for the Sciences of the Universe]
 UMR: Unité mixte de recherche [Mixed Research Unit]
 EA: Equipe d'Accueil [Welcoming Team]
 FED: Fédération de Recherche [Research Federation]



Labex MER *A changing ocean*

The ocean, as it regulates climate, may also become an accelerator of climate changes if its energy cycle, biodiversity, or major biogeochemical cycles are disrupted. The goal of Labex Mer is to bring together the best researchers in this field to improve our knowledge and resolve urgent issues.

Supported by UBO, Labex Mer includes 11 research units connecting researchers at the Universités de Bretagne Occidentale (UBO) et de Bretagne Sud (UBS) [Universities of Western and Southern Brittany], and Université de Nantes; 3 research organisms (Ifremer, CNRS, IRD); and the Ecole Centrale de Nantes. The project is coordinated by the Institute Universitaire Européen de la Mer (IUEM) [European Institute for Marine Studies] at UBO, in Brest. It was developed based on the collaborative relationships established five years ago by the Europôle-Mer Scientific Interest Group. As it offers fertile ground for research and scientific excellence, an interdisciplinary approach, and academic commitment, Labex Mer has benefited from a 10-year, €11-million grant.

7 research areas with 130 researchers have been defined for the 1st phase of the project.

Their objective is to improve our understanding of the following issues:

- Contribution of small-scale movements crucially influencing the function of the world's oceans
- The "Biological Pump": oceanic carbon regulating the amount of carbon dioxide in the atmosphere
- Geobiological interactions in the extreme environments of the ocean depths (notably, hydrothermal springs)
- Transfer of sediments from the coasts to the depths, both by fast-acting phenomena, such as storms or earthquakes, and by slower geological processes
- The future of coastal zones: observing and modelling their changes
- Changes in marine habitats, adaptation and the role of biodiversity
- Mechanics of ocean movements and their interaction with marine systems.

Contact :
<http://www.labexmer.eu/>
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Labex CAMI *Innovative Medical Tools and Techniques*

The CAMI (Computer-Assisted Medical Interventions) project will make it possible to explore new approaches in computer-assisted surgical procedures with the aim of improving the precision possible for surgeons, promoting informed decision-making, and facilitating education in these new technologies for practitioners. Labex CAMI also aims to build partnerships with industry around unifying projects with high value-adding potential.

Labex CAMI unites all 6 French research laboratories launching new methodological and technological concepts, clinically proven and transformed into widely-available industrial products. Its network is spread across 5 regions: Alsace, Brittany, Ile-de-France, Languedoc-Roussillon, and Rhône-Alpes, where its activities are based around universities and university medical centres in: Brest (Laboratoire LATIM), Rennes (LTSI), Strasbourg, Paris, Montpellier, and Grenoble, and is supported by the CNRS, the Institut Télécom, and INSERM. It is directed by Professor Philippe Cinquin (TIMC-UJF Lab - Grenoble).

Computer-assisted medical treatment is one of the most elite sectors of health technology in France. Labex CAMI links national skills in the field and puts in place a rational task force able to cover the entire continuum between methodological and translational research:

- Build a unique integrated interface for institutional and industrial representatives of France and other European countries
 - Incorporate scientific and technological advances on problems of perception, decision-making, and action during the entire procedure based on the development of new, more precise, faster assistance systems which respond adequately to the needs of clinicians
 - Improve overall patient care by keeping health costs at a controlled level
 - Develop the initial and continuing education of students in Master or engineering programs, and especially PhD candidates in the field.
- This structuring of research through CAMI will allow France to play a major role on the European scale. The field of computer-assisted medical intervention has created new start-up companies and, with them, new jobs.

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Labex IGO *Innovations in immunotherapy for oncology and transplantation*

By gaining better knowledge of the immune response mechanisms of the body, the Labex IGO (Immunothérapies Grand Ouest) project will allow the testing of new treatments against cancer, organ rejection, and autoimmune disorders.

By promoting advances in immune response control in the body, the IGO project will make it possible to develop new, more effective, and less invasive forms of treatment against cancer or organ rejection. By uniting research teams working on immunology, oncology, transplantation, and autoimmunity, the IGO project will contribute to the formation of a centre of excellence in fundamental human immunology and the creation of an institute dedicated to the development of personalized medicine.

The project aims to explore the great potential for immunotherapy and eventually provide therapeutic solutions for presently incurable diseases, thus creating innovative opportunities for large-scale production, with far-reaching economic and societal impact.

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Labex COMIN LABS *For the Internet of the future*

The central theme of Labex Comin Labs (Communication and Information Science Laboratories) is the Internet of the future, from its lowest layers (networks, telecommunications) to its highest layers (applications, services, users).

Led by the Université Européenne de Bretagne Consortium and involving 1,100 researchers, the project aims to strengthen the international profile of this field of research in the regions of Brittany and Pays de la Loire.

Comin Labs' scientific environment lies in two major areas:

- 4 interdisciplinary research projects in the fields of: neural coding, STIC and energy efficiency, social networks, and STIC security and privacy
- 3 major challenges: the digital environment for the average citizen, cutting-edge technology in images and digital media, STIC for personalized medicine

Comin Labs offers an innovative administration model - the community functions as a social network to develop a platform for interaction and adaptive collaboration.

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EQUIPEX NAOS *Observing and forecasting the world's oceans*

NAOS (Novel Argo Ocean Observing System) is one of the award-winning projects in the first wave of the "Equipements d'Excellence" call for proposals. It aims to improve predictions about the consequences of climate change in everyday life thanks to the placement of new monitoring buoys. Equipex will also boost French participation in the Argo international ocean surveillance network.

The new research and related development activities being carried out by Equipex are the result of a partnership between Ifremer, UPMC (Université Pierre et Marie Curie - co-leader), UBO/IURM, CNRS (INSU), SHOM, and two private companies: CLS for satellite telecommunications; and PME NKE for marketing the French Argo floats. The project is coordinated by Ifremer.

One of NAOS' major objectives is to develop and finalize the next generation of Argo floats. These floats will be more intelligent, able to deploy new sensors and reach new depths. They will also be capable of measuring the biogeochemical characteristics of the ocean. Thanks to an €8-million grant, 135 new temperature- and salinity-measuring floats will be installed. They will join the 3000 floats currently spread across the world's oceans. This project is thus intended to establish a true ocean surveillance system and to strengthen French excellence in observing and forecasting the oceans and climate.

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L'Institut de Recherche Technologique [Institute for Technological Research] (IRT) B-COM *A major actor in the digital revolution*

Created as a scientific foundation, IRT B-Com is a multidisciplinary institute aiming to drive international, technological innovation in STIC (Science and Technology of Information and Communication). As it is the IRT for the Internet of the future, B-Com is certified by the Images et Réseaux competitiveness cluster and will bring the highest level of innovation to the field of images, ultra-high-speed landline and mobile networks, and cutting-edge medicine.

B-Com has approximately 40 members: manufacturers (France Télécom, TDF and Thomson VN), and a GIE [Economic Interest Group] of 21 innovative small- and medium-sized business, as well as several academic structures such as INTIA, INSA, Université de Rennes 1 and 2, UBO, Supélec Télécom Bretagne, EESAB, ENIB, ENSTA Bretagne, ENS Rennes, ESC Rennes.

With the dawn of hyperconnectivity, the digital revolution will be driven by the exploration of new possibilities for immersion and interaction with pioneering new content, anywhere and at any time. Brittany is one of the rare places in the world where there are major innovators active in all these sectors. IRT B-Com is promoting co-investment and public-private partnerships by:

- Leading technological research programs coupled with technological platforms and training
- Performing technological research
- Ensuring the socio-economic value of the results obtained

B-Com's goal is to become a world leader in innovation, immersion, and hyperconnection with inventive new content.

Contact :
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L'Institut d'Excellence en Énergies Décarbonées dédié aux Énergies Marines Renouvelables (IEED FEM) [The Institute of Excellence in Renewable Marine Carbon-Free Energies] *A key player in the development of renewable marine energies*

The FEM Public Interest Group brings together 58 actors in the marine energy sector through an original public-private partnership. Industry entities such as Alstom, Areva, DCNS and EDF, along with public entities like CNRS, Ecole Centrale de Nantes, ENSTA Bretagne, UBO, and Ifremer, are working together in synergy to form a new French industry, and thus position FEM as an international leader in offshore wind, wave, and thermal energy.

IEED FEM has 3 primary functions:

- Independent and collaborative research through specialized projects and in the form of services for the entire marine energy industry
- Setup and coordination of sea trial sites for different technologies,
- Creation of a resource and training centre.

Contact :
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 **UBO AND INTERNATIONAL COOPERATIVE RESEARCH**



Source: OESR du Pays de Brest 2010 data

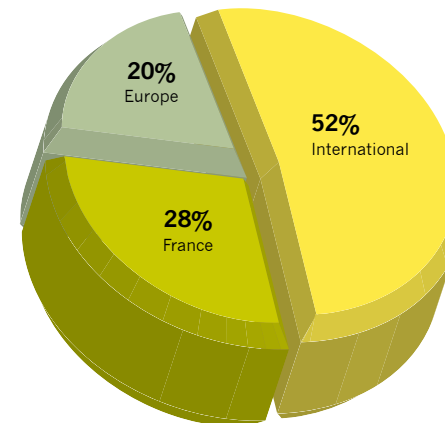
UBO is present on the local level, in its teaching missions and its involvement in economic development projects, as well as on the global level.

Developing an international approach is an essential part of the objectives set by the university in its 2012-2016 strategic plan.

Over the course of the last few years, UBO has implemented a development policy on world-wide exchange, involving:

- international students
- participation in European research programs
- publications in scientific reviews
- international researchers

SCOPE OF UBO-ORGANIZED SYMPOSIUMS



Source: OESR du Pays de Brest 2010 data

The field of marine activities represents excellence and interdisciplinary cooperation, supported by the consolidation of nationally-recognized teams and their international partnerships.

ORGANIZATIONAL STRUCTURE

Most of these teams form part of the **Institut Universitaire Européen de la Mer (IUEM)**, an internal school of UBO. IUEM is an interdisciplinary centre whose objectives are to spread knowledge on the marine world, to study and observe its interactions with the atmosphere and continental areas, to train researchers and staff in these fields, and to contribute to observing both natural and man-made changes in these environments.

IUEM became an **Observatoire des Sciences de l'Univers (OSU)** in 2005, under the authority of UBO, CNRS, and IRD. A laboratory at the Université de Bretagne Sud is also part of IUEM. The network is complemented by a mechanics laboratory linking the UBO, ENSTA Bretagne, and ENI Brest. Ifremer works in partnership with four of the six mixed research units at IUEM.

The fields of study include both coasts and offshore areas:

Offshore

- In the offshore domain, research examines life in the extreme environments of the depths, the creation and evolution of the Earth's crust in undersea zones, or ocean circulation and its relationship with climate.

Coasts

- In the coastal domain, teams study biodiversity, coastal dynamics, the impact of climate and man-made phenomena, as well as maritime economics and law.
- The principal areas of study are Earth sciences, biology, microbiology, ecology, chemistry, physics, mechanics, geography, law, and economics. Monitoring these fields is an important activity for the OSU.

MARINE SCIENCES

In the marine sciences field, UBO has developed a specific approach to training and instruction, unique in France: Sciences de la Mer et du Littoral [Marine and Coastal Sciences] (SML).

Courses are run at the Master (Sciences de la Mer et du Littoral) and doctoral (Ecole Doctorale des Sciences de la Mer) levels.

IUEM's geographical location, close to other research organisations active in marine sciences, has allowed the creation of collaborative technical structures and platforms, such as the Bibliothèque La Pérouse (marine documentation centre shared between UBO, Ifremer, and IRD), the Pôle de Spectrométrie Océan [Ocean Spectrometry Centre], and the Pôle de Calcul Intensif pour la Mer [High-performance Computing Centre for the Ocean].

FLAGSHIP PROJECTS

Labex MER

The creation of Labex Mer, "A Changing Ocean" is an investment for the future, helping to build Brest's reputation in the field. Led by IUEM, this project unites collaborators from all over western France: research institutes, universities, and engineering schools.

Marine Board

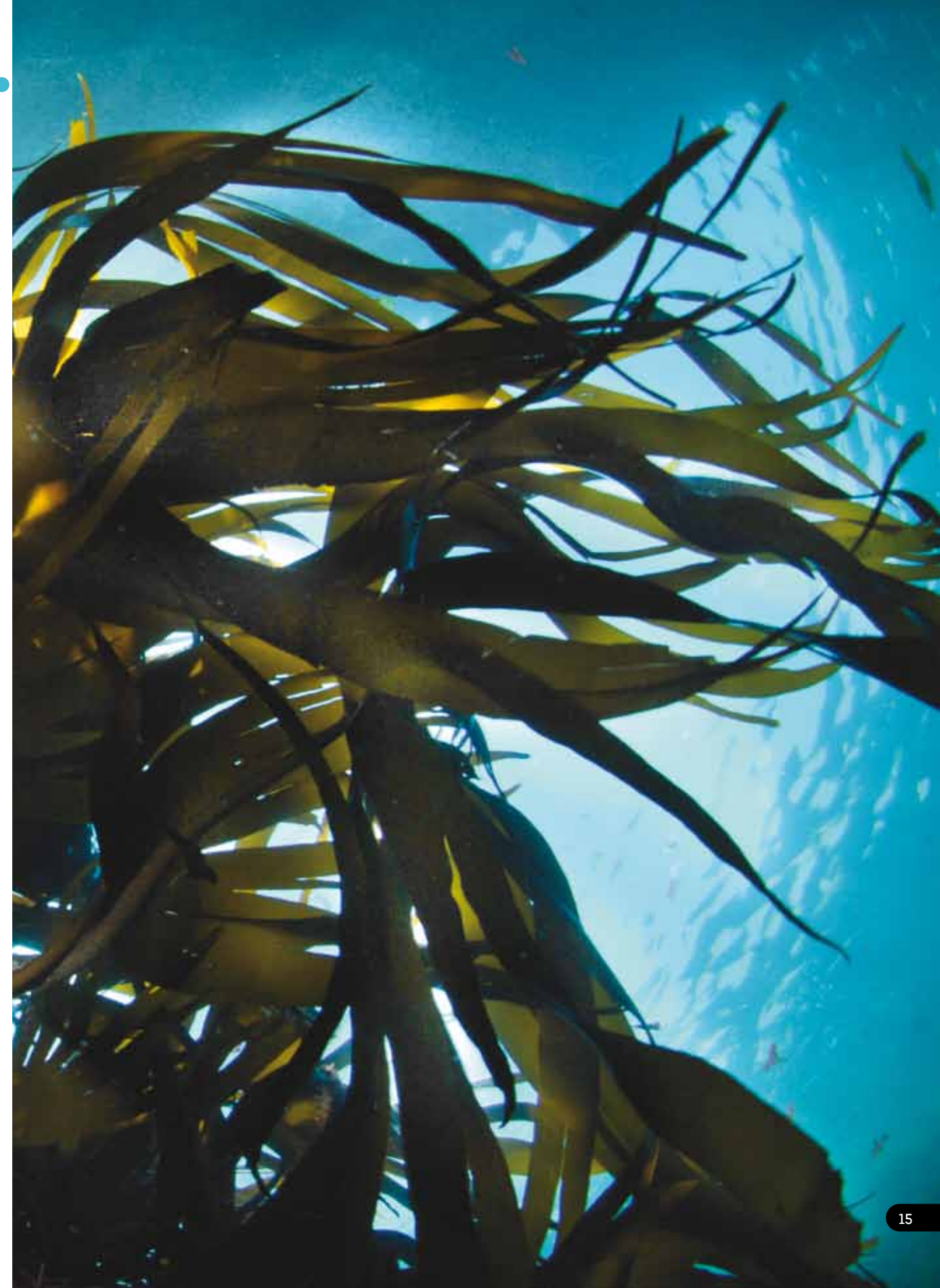
UBO also heads a consortium of 13 French universities working in the marine sector, and serves in the French research bodies CNRS and Ifremer on the European Marine Board.

COLLABORATIONS

Europôle MER

UBO is a key player in the scientific interest group Europôle Mer, recognized and supported by the Ministry of Higher Education and Research, CNRS, and Ifremer. Europôle Mer is a consortium uniting IUEM (UBO, CNRS, INSU) with Ifremer, the Station Biologique de Roscoff (UPMC, CNRS, INSU), the Université de Bretagne Sud, the Muséum National d'Histoire Naturelle at Concarneau, the Institut de Recherche pour le Développement (IRD), the French Polar Institute (IPEV), the Service Hydrographique de la Marine (SHOM), and five engineering schools involved in marine education and research (Ecole Navale, Télécom Bretagne, ENSTA Bretagne, ENIB, and ISEN), and the Centre de Culture Scientifique et Technique Océanopolis

Research unit	Code	Director	Affiliations	Contact
European Institute of Marine Science OSU	UMS 3113	Anne-Marie Tréguier	CNRS, IRD, UBO	direction.iuem@univ-brest.fr Tel. +33 (0)2 98 49 86 64
Ocean Physics Laboratory - LPO	UMR 6523	Fabrice Ardhuin	CNRS, IFREMER, IRD, UBO	Fabrice Ardhuin dir.lpo@ifremer.fr Tel. +33 (0)2 98 22 42 95 www.ifremer.fr/lpo
Oceanic Domains Laboratory - LDO	UMR 6538	Christophe Delacourt	CNRS UBO	Christophe.delacourt@univ-brest.fr Tel. +33 (0)2 98 49 87 10 Dir-umr6538@univ-brest.fr www.sdt.univ-brest.fr
Marine Environmental Sciences Laboratory LEMAR	UMR 6539	Olivier Ragueneau	CNRS, IFREMER, IRD, UBO	Olivier.ragueneau@univ-brest.fr Tel. +33 (0)2 98 49 86 56 www.univ-brest.fr/IUEM/UMR6539
Coast, Environment, Remote Sensing, Geomatics - Equipe GEOMER - LETG	UMR 6554	Marc Robin (univ.Nantes)	Université de Caen Basse Normandie, Nantes, Rennes 2, UBO, CNRS	GEOMER Team : Louis Brigand (UBO) Louis.brigand@univ-brest.fr Tel. +33 (0)2 98 49 86 87 Letg.univ-nantes.fr
Extreme Environment Microbiology Laboratory - LM2E	UMR 6197	Mohamed Jebbar	UBO, IFREMER CNRS	Mohamed Jebbar (UBO) Mohamed.jebbar@univ-brest.fr Tel. +33 (0)2 98 49 88 17
Development of Uses of Resources and of Marine and Coastal Areas] – Centre for Law and Economics of the Sea - AMURE	UMR-M 101	Olivier Thébaud (Ifremer)	UBO, IFREMER	Olivier Thébaud AmureDir@ifremer.fr Tel. +33 (0)2 98 22 49 89 www.umr-amure.fr Denis Bailly (UBO) Annie Cudennec (UBO)
Center for Education, Marine and Atmospheric Sciences over Africa ICEMASA	LMI	François Marsac	UBO, IRD CNRS-INSU MA-RE, Univ. CAPE TOWN	francois.marsac@ird.fr www.icemasa.org
Brest Laboratory of Mechanics and Systems - LBMS	EA 4325	Sylvain Colloc'h (ENSTA Bretagne)	ENSTA Bretagne UBO ENIB	Sylvain Colloc'h Mohamed benbouzid (UBO) Mohamed.benbouzid@univ-brest.fr Tel. +33 (0)2 98 01 80 07
Biology and Genetics of Marine Mammals in their Environment BIOGEMME	ERCRC	Jean-luc Jung	UBO	Jean-luc Jung Jean-luc.jung@univ-brest.fr Tel. +33 (0)2 98 01 61 29



HEALTH AND THE FOOD INDUSTRY

This area of activity is organized by the IBRBS (Institut Brestois de Recherche en Biologie et Santé [Brest Research Institute for Biology and Health]) with the ScInBioS [Sciences and Engineering in Biology and Health] federative research structure.

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Fields of study:

- Genetics
- Immunology
- Microbiology
- Chemistry of the living cell
- Health technologies
- Physiology
- Neuroscience

COLLABORATION

This is the key field of interest at Biogenouest and at Cancéropôle Grand Ouest.

The food industry is associated with the Valorial competitiveness cluster.

MATERIALS

This area brings together 3 laboratories at UBO: UMR CNRS 6521, LI-MATB, and the LSOL laboratory.

Fields of study:

- Chemistry
- Rheology
- Laser physics

Research unit	Code	Director	Affiliations	Contact
Genetics, Functional Genomics and Biotechnology	UMR_S 1078	Claude Férec	EFS INSERM UBO	Claude Férec Claude.Ferec@univ-brest.fr Tel. +33 (0)2 98 44 50 64/41 38 Site : http://www.univ-brest.fr/medecine/
Laboratory for the Treatment of Medical Information - LATIM	UMR_S 1101	Eric Stindel	INSERM Telecom Bretagne UBO	Eric Stindel Eric.stindel@univ-brest.fr Tel. +33 (0)2 98 01 81 30 Site : http://latim.univ-brest.fr/
Molecular Chemistry, Electrochemistry & Analytical Chemistry Laboratory - CEMCA	UMR 6521	Yves Le Mest	CNRS UBO	Yves Le Mest Yves.lemest@univ-brest.fr Tel. +33 (0)2 98 01 61 44/61 27
Immunology and Pathology	EA 2216	Jacques Olivier Pers	UBO	Jacques Olivier Pers pers@univ-brest.fr Tel. +33 (0)2 98 22 33 84
Thrombosis Study Group of Western Brittany - GETBO	EA 3878	Grégoire Le Gal	UBO	Gregoire Le Gal Gregoire.legal@univ-brest.fr Tel. +33 (0)2 98 34 73 36/71 91
Optimization of Physiological Regulations - ORPHY	EA 4324	Christine Moisan	UBO	Christine Moisan Christine.moisan@univ-brest.fr Tel. +33 (0)2 98 01 64 60 Site : http://www.physiology-orphy.fr/
Sport and Health Movements M2S	EA 1274	Benoît Bideau	ENS Rennes Univ Rennes 2 Univ Rennes 1 UBO	Benoît Bideau (Rennes 2) Marie-Agnès Giroux-Metges (UBO) Marie-agnes.metges@univ-brest.fr Tel. +33 (0)2 98 01 80 67
University Laboratory for Biodiversity and Microbial Ecology - LUBEM	EA 3882	Emmanuel Coton	UBO	Emmanuel Coton Emmanuel.Coton@univ-brest.fr Ivan Leguérinel – site Quimper Ivan.leguerinel@univ-brest.fr Tel. +33 (0)2 98 05 61 28 Site : www.univ-brest.fr/LUBEM
Brest Neuroscience Laboratory - LNB	EA 4685	Laurent Miséry	UBO	Laurent Misery (CHU) laurent.misery@chu-brest.fr Tel. +33 (0)2 98 22 23 15 Jean-Luc Carre (UBO) Jean-luc.carre@univ-brest.fr Tel. +33 (0)2 98 01 64 53
Spectrometry and Laser Optics Laboratory- LSOL	EA 938	Bernard Le Jeune	UBO	Bernard Le Jeune Bernard.lejeune@univ-brest.fr Tel. +33 (0)2 98 01 73 78
Federation for Research in Food and Human Nutrition	FED 4216	Jacques Delarue	UBO	Jacques Delarue Jacques.delarue@univ-brest.fr Tel. +33 (0)6 83 8139 63
Materials Engineering Laboratory of Brittany - LIMAT^B	EA 4250	Yves Grohens	UBO	Yves Grohens Yves.grohens@univ-ubs.fr Thierry Aubry (UBO) Thierry.aubry@univ-brest.fr Tel. +33 (0)2 98 01 66 70
Laboratory for the Evaluation of Chemical Risk for the Consumer LERCCo	ERCS	Alain Claude Roudot	UBO	Alain Claude Roudot Alain-claude.roudot@univ-brest.fr Tel. +33 (0)2 98 01 79 82
First Aid, Public Health, Cancer Registry of Brittany - SPURBO	ERCS	Jean-Yves Le Reste	UBO	Jean-Yves Le Reste Jean-Yves.lereste@univ-brest.fr
Centre for Clinical Investigation CIC	CIC 0502	Dominique Mottier	UBO INSERM CHRU de Brest	dominique.mottier@chu-brest.fr cic@chu-brest.fr Tel. +33 (0)2 98 34 25 25
Sciences & Ingénierie en Biologie-Santé ScinBioS	FED 4215	Laurent Corcos	UBO INSERM	Laurent Corcos laurent.corcos@inserm.fr Tel. +33 (0)2 98 01 83 01

The Maths-STIC field is built on three laboratories, including two sizable labs affiliated with the CNRS.

Mathematics

The CNRS Mathematics UMR (Unité mixte de recherche [Joint Research Unit]) unites teams from UBO and UBS.

Lab-STICC

Lab-STICC UMR CNRS is a research unit studying sciences and technologies for communication in the broad sense, working in electronics, computer sciences, acoustics, physics, and applications. It unites Télécom Bretagne, UBO, UBS, ENSTA Bretagne, and ENIB, counting 238 researchers and lecturer/researchers.

The group conducts fundamental research as well as applications in various economic sectors, notably in components, materials, computers, virtual reality, coding, signal processing, telecommunications, and multimedia. Special emphasis is placed on interaction with other disciplines, especially between mathematics and STIC, for which coding, modelling, and digital simulation play an increasingly important role. Algebraic and differential geometry, dynamic systems, and probability, as well as applied analysis, are the areas of mathematical excellence. Notable developments among the new directions in this field include the development of nanosciences, research on human-machine interaction, multimedia indexing, information systems security, and interactive processing of large volumes of data.

Fields of study:

- Mathematics
- Electronics
- Computer science
- Telecom sciences
- Physics

COURSES

Courses in this area are organized through the Master in STS and the SIC-MA doctoral school in association with UBS, Télécom Bretagne, ENSTA Bretagne, and ENIB.

FLAGSHIP PROJECTS

Labex Comin Labs [Communication and Information Sciences Laboratories] connects the foremost STIC organisms in Brittany, Lab-STICC being an important member.

COLLABORATION

This area is strongly tied to the Images et Réseaux competitiveness cluster as well as to IRT B-Com for developments in technology. The field has also led to the creation of numerous companies and patents.

Research unit	Code	Director	Affiliations	Contact
Information Science and Technology, Communication and Knowledge Laboratory LABSTICC	UMR 6285	Gilles Coppin	Télécom Bretagne, UBO, UBS, CNRS, ENSTA Bretagne, ENIB	Laurent Nana (UBO) laurent.nana@univ-brest.fr Tel. +33 (0)2 98 01 71 67
Mathematics Laboratory Bretagne Atlantique · LMBA	UMR 6205	Benoît Saussol	UBO, UBS, CNRS	Benoît Saussol benoit.saussol@univ-brest.fr Tel. +33 (0)2 98 01 62 07
Brittany Magnetism Laboratory · LMB	EA 4522	Bruno Rouvellou	UBO	Bruno Rouvellou bruno.rouvellou@univ-brest.fr Tel. +33 (0)2 98 01 61 04

Represented by 250 lecturer-researchers, the various disciplines in the field range from education, geography, urban planning, history, ethnology, sociology, philosophy, linguistics, psychology, literature, and languages, to law, management, and economics.

FEDERATIVE STRUCTURES

ISHS

Institute for Humanities and Social Sciences

This Institute unites 13 laboratories, including one associated with CNRS, two with UBS, three with Rennes 2, one with Nantes, and one with Télécom Bretagne. Its mission is to maintain and strengthen collaboration between teams to pool and share tools and human resources, create synergy for a shared scientific dynamic, and to develop an internal and external dynamic, especially in communities, libraries, archives, and museums. The unifying theme is "transmission"; its four branches are Digital Humanities, Heritage and Territories, Social Issues, and the Americas (IDA).

MSHB

Human Sciences Institute in Brittany

As a regional structuring body, the MSHB unites the all research bodies in Arts, Literature, Languages, Humanities and Social Sciences (ALLSHS) in Brittany. Created by 4 Breton universities and the CNRS, the MSHB today counts 7 founding members along with the École des Hautes Etudes en Santé Publique [School for Higher Studies in Public Health] (EHESP) and Télécom Bretagne. The MSHB, a service and research unit (USR 3549) was created on May 1, 2012. It was previously a mixed service unit (UMS 3122) since January 1, 2008.

Research themes:

- The "Societies and Health" branch aims to produce multidisciplinary analyses of health, taking into account the spatial, temporal, and cultural diversity of social life.
- The "Uses for TIC-M@rsouin" branch supports research on e-practices and the changes they induce in social practices, in coordination with the activities of the M@rsouin ["Porpoise"] Scientific Interest Group.
- "Armorican and Atlantic Worlds" conducts research on an area encompassing regions on both sides of the Atlantic.
- "Governance in Public and Private Institutions" analyses methods for the management of human societies at different epochs, situations and territories.

COURSES

This field is the backbone for three Master subjects:

- ALL: Arts-Literature-Languages
- SHS: Human and Social Sciences
- DEG: Law-Economics-Management

Any of these may be followed by further studies in one of 3 doctoral schools co-accredited with Rennes I, Rennes II, and UBS, in ALL, SHS, or SHOS.

COLLABORATIONS

Public Interest Group

- Maritime History; Observatory for Coastal Maritime Heritage
- Institute for the Americas

Research unit	Code	Director	Affiliations	Contact
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DISCOVER UBO

3 SEASIDE CAMPUSES

- Main campus located in Brest, situated in the city centre and just minutes from the beach; 1 hour away from Paris by air, 4 hours by train
- Satellite campuses in Quimper and Morlaix

A MULTIDISCIPLINARY UNIVERSITY

- 18,000 enrolled students in all fields
- 9% international students
- Friendly and dynamic student atmosphere

AT THE FOREFRONT OF DIGITAL TECHNOLOGY

- Brittany has fully embraced high-speed internet
- Campus-wide wifi
- Fast-growing digital services

A COASTAL CITY

- Home to 60% of all French marine researchers
- 60 nautical events per year, including "Les Tonnerres de Brest"
- The Océanopolis centre with 55 aquariums, hosting 1,000 different species

CULTURE, SPORT AND HERITAGE

- Theatres like the nationally renowned Quartz, concerts, festivals, a fine arts museum, conservatories
- Nautical sports and hiking along 350km of coastline
- Traditional small towns and exceptional historical monuments
- Remarkable natural heritage and breathtaking offshore islands
- Traditional legends and a vibrant history



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