

MASTER THESIS OFFER (2014/15) MER

30 ECTS: 6 mo

TITLE	DESCRIPTION (5-10 lines)	SUPERV. (Name; Contact e-mail)	LOCATION (Res Grp: Lab, Dept, Inst, City)	FUNDING (if available)	REQUISITES / NAME (if needed /if agreed)
Microsporidian hyperparasites of paramyxids	The paramyxids are an obscure order of parasitic protists within the phylum Cercozoa of the supergroup Rhizaria. The single family order, comprised of three genera (<i>Marteilia</i> , <i>Paramarteilia</i> and <i>Paramyxa</i>) is sister to the Haplosporida and Claustrosporida within the phylum. All subtaxa within the three orders are parasites of invertebrate hosts. Recent work utilising genome sequence data from representative lineages within the Rhizaria have revealed how certain groups (e.g. the mikrocytids) are more diverse and wide spread in aquatic habitats than previously thought. Despite this, the rhizarians, and their constitutive taxa, remain one of the most understudied groups. Representatives of the genus <i>Marteilia</i> are perhaps the best studied paramyxids, largely due to their impact on cultured oyster stocks, and their listing in international legislative frameworks. Recent work in our laboratories has shown that <i>Marteilia</i> can be hyperparasitised by microsporidian parasites, another understudied but important pathogen group in aquatic animals. Phylogenetic analyses of the microsporidians infecting <i>Marteilia</i> have revealed that rather than forming a distinctive (protist-infecting) clade, they are actually similar to taxa already known to infect aquatic crustacean hosts. As such, we have proposed that paramyxids (such as <i>Marteilia</i>) and potentially other protistan hosts, may have the potential to traffic microsporidians between metazoan hosts (e.g. molluscs to crustaceans). In this study, we want to investigate this hypothesis by sampling an array of crustacean hosts inhabiting environments where paramyxids are known to infect molluscs. In doing so, we will assess whether these crustacean hosts can be infected by microsporidian taxa shown to hyperparasitize paramyxians at the same site/time. We will sample animals from field sites in the UK and Spain and will analyse materials using an array of diagnostic tools (histology, transmission electron microscopy, molecular diagnostics). The student will gain specialised skills in fieldworking, pathology and phylogeny of aquatic animal pathogens.	Stentiford, G.D. ¹ , Bass, D. ² , Feist, S.W. ¹ , Villalba, A. ³	¹ Centre for Environment, Fisheries and Aquaculture Science (Cefas), Weymouth Laboratory, Dorset DT4 8UB, United Kingdom ² Department of Life Sciences, The Natural History Museum, Cromwell Road, SW7 5BD, London, UK ³ Centro de Investigaciones Marinas, Conselleria do Medio Rural e do Mar, Xunta de Galicia, Aptdo.13, Vilanova de Arousa, 36620 Spain	No	
Trends in wave climate over the Northern Atlantic from satellite images	INTRODUCTION: Several research papers [1,2,3,4] suggest that in the North Atlantic, the significant sea wave height (Hs) values exhibit a growing trend during the last decades. Additionally, other studies [5,6] have detected a declining trend below 40° degrees of latitude for the same parameter. GENERAL OBJECTIVE: Identify the significant trends of the wave energy flux (WEF) in the gridpoints covering the area [-100.125E, 10.125E] [81N, 19.125N] corresponding to the period 1993-2008 as seen by satellites. SPECIFIC OBJECTIVES: 1. Calculate and map the significant trends of Hs for the area and period as seen by satellites 2. Calculate and map the mean wave period (Tz) significant trends for the area and period as seen by satellites 3. Calculate and map the WEF significant trends for the area and period as seen by satellites REFERENCES [1] Kushnir, Y., V. J. Cardone, J. G. Greenwood, M. A. Cane, 1997: The Recent Increase in North Atlantic Wave Heights. <i>J. Climate</i> , 10, 2107–2113.	Gabriel Ibarra gabriel.ibarra@ehu.es Jon Saenz jon.saenz@ehu.es	Research Group: Eolo (UPV/EHU) http://www.ehu.es/eolo Laboratory: Research Centre for Experimental Marine Biology and Biotechnology, Plentzia, Spain http://www.ehu.es/PIE/overview/index.html Department: Nuclear Engineering and Fluid Mechanics and Applied Physics II	There is no funding available	An intermediate level of the freely available software R is needed. In this website, a whole set of useful materials can be found. As a reference, among many others, the following tutorial as given in MER during this course by the supervisors may be helpful ftp://ftp.ehu.es/cidirb/p/rofs/inpibbeg/sea_wav

	<p>doi: <a href="http://dx.doi.org/10.1175/1520-0442(1997)010<2107:TRIINA>2.0.CO;2">http://dx.doi.org/10.1175/1520-0442(1997)010<2107:TRIINA>2.0.CO;2</p> <p>[2] Gulev, S. K., and V. Grigorieva (2004), Last century changes in ocean wind wave height from global visual wave data, <i>Geophys. Res. Lett.</i>, 31, L24302, doi:10.1029/2004GL021040.</p> <p>[3] The AES40 North Atlantic Wave Reanalysis: Validation and Climate Assessment; Val R. Swail, Environment Canada, Ontario, Canada, E.A. Ceccacci and A. T. Cox., Oceanweather, Inc., Cos Cob, CT VALIDATION AND CLIMATE ASSESSMENT. 6th International workshop on wave hindcasting and forecasting. http://www.kennisbank-waterbouw.nl/dicea/repository/IWWHF6.htm.</p> <p>[4] Frode Vikebø, Tore Furevik, Gunnar Furnes, Nils Gunnar Kvamstø, Magnar Reistad. 2003. Wave height variations in the North Sea and on the Norwegian Continental Shelf, 1881–1999. <i>Continental Shelf Research - CONT SHELF RES</i> 01/2003; 23(3):251-263. DOI:10.1016/S0278-4343(02)00210-8</p> <p>[5] Xiaolan L. Wang & Val R. Swail & Francis W. Zwiens & Xuebin Zhang & Yang Feng. Detection of external influence on trends of atmospheric storminess and northern oceans wave heights <i>Clim Dyn</i> (2009) 32:189–203. DOI 10.1007/s00382-008-0442-2</p> <p>[6] Xiaolan L. Wang, Yang Feng, V. R. Swail. 2012. North Atlantic wave height trends as reconstructed from the 20th century reanalysis. <i>Geophysical Research Letters</i> Volume 39, Issue 18, September 2012.</p>		<p>Institution: University of the Basque Country (UPV/EHU) http://www.ehu.es City: Plentzia-Bilbao</p>		<p>e_energy/MER_2013_tutorial/</p>
<p>Transgenerational effects of nanomaterials in invertebrates</p>	<p>Manufactured nanomaterials (NMs) are considered as emergent contaminants and increasing concentrations are expected in the aquatic environments. As NMs display new physico-chemical properties, their toxic potential must be evaluated. Intensive research is being done in this field and many data on acute and short-term toxicity are already available. Nevertheless, long-term, chronic or transgenerational effects are much less investigated. For this kind of studies, small invertebrates with short life-cycles, such as <i>Artemia sp.</i>, are especially suitable. Thus, the objectives of the project are: (1) to study the effects of selected NMs on ecologically relevant parameters such as growth and reproduction in <i>Artemia sp.</i> and (2) to study transgenerational effects of exposure to NMs.</p>	<p>Amaia Orbea, amaia.orbea@ehu.es</p>	<p>Cell Biology in Environmental Toxicology» Research Group. Leioa/Plentzia</p>	<p>Basque Government to CBET research group</p>	<p>Preferable Degree in Biosciences (but not compulsory)</p>
<p>Quantitative genetics underlying trait differentiation among and within wild trout populations of varying abundance</p>	<p>The primary aim of this research is to use a combination of molecular and quantitative genetic approaches of wild trout populations to natural and anthropogenic influences. Most fitness traits that are related to the long-term viability and persistence of populations are encoded by a number of genes that interact with each other, and are influenced by the environment. Thus, we will use a combination of molecular and quantitative genetic methods to describe trait variation and to track changes in these traits. Our research has implications for the conservation and management of wild trout populations, because we need to understand how these populations will respond to a changing environment. Specifically, we need to be able to identify natural environmental influences on the evolution of fitness traits, and then to anticipate how populations might respond to activities such as harvest, environmental changes, and conservation actions such as reintroductions and supportive breeding. This knowledge will assist us in taking proactive strategies to reducing human impacts on natural populations. Our research program will follow two main pathways:</p> <p>The fitness consequences of population structure: Both mating within (inbreeding) and between (outbreeding) populations can lead to positive or negative changes in individual fitness and in population structure. Human-induced evolution of correlated traits in fish populations: Many quantitative traits are genetically correlated with each other, and selection on one trait might elicit an unanticipated response in another. Human activities such as harvest and captive rearing might have evolutionary consequences – but the population response is often difficult to predict. Our attempts to understand correlated responses in phenotypic traits are important not only for predicting evolutionary change, but also allow us to</p>	<p>Dylan J. Frasser. Dylan.fraser@concordia.ca</p>	<p>Dep. Biology. University of Concordia, Montreal (Canada)</p>		

	investigate alternative management scenarios that might reduce this change.				
<p>Metamorphosis and larval recruitment of the coral reef fish <i>Platax orbicularis</i></p>	<p>Coral reef fish have a complex life cycle with pelagic larval stages followed by juvenile and adult demersal stages (Leis & McCormick 2002). This transition between an oceanic and a reef habitat involves ontogenetic changes in morphology, physiology and behavior as pelagic larval stages colonize benthic habitats (Lecchini <i>et al.</i> 2014). This crucial step in reef fish life cycle is called "larval recruitment". The term "metamorphosis" is now used to encompass the changes in structure and function, which often coincide with settlement. These changes occur as a fish larva takes on its juvenile form (Fig.1, Fig.2, McCormick <i>et al.</i> 2002, Laudet 2011). Metamorphosis is thought to occur because individuals must possess characteristics that maximize survival in each environment (Werner 1988) and after a first approach on groupers (Jesus <i>et al.</i> 1998) it is now understood that thyroid hormones (TH) are involved in the metamorphosis of reef fishes (Laudet 2011). The recent collaboration between Prof. David Lecchini (CRIOBE) and Prof. Vincent Laudet (IGFL) have already begun to characterize the molecular pathway (especially TH) involved in the metamorphosis of <i>Acanthurus triostegus</i>. We are seeking a highly motivated and curious candidate to study the metamorphosis of <i>P. orbicularis</i>. The student will be involved in one of the two following projects:</p> <p>1. The TH molecular pathway during the metamorphosis of <i>Platax orbicularis</i> <i>P. orbicularis</i> larvae are available at the Aquaculture Center of Tahiti. Thanks to collaboration with the CRIOBE, the student will be able to obtain <i>P. orbicularis</i> larvae at any developmental stage and to maintain them at the CRIOBE aquarium facilities. Larvae will be anaesthetized at different stages of their larval development in order to measure:</p> <ul style="list-style-type: none"> (i) their HT levels (T3/T4 dosage by radioimmunoassays and Elisa) (ii) the mRNA expression levels of the actors of the TH molecular pathway (deiodinases and TRaA, TRaB and TRb receptors) by Q-PCR and <i>in situ</i> hybridization, in different organs: blood, liver, kidneys, brain, gills and muscle tissues (iii) the activity of the thyroid gland, after fixation in Bouin's solution, by analyzing the histology of its colloid with Schiff's reagent and α-T4 antibodies <p>2. The importance of this pathway in the larval recruitment of <i>P. orbicularis</i>. By using pharmaceutical treatments (T3/T4 and goitrogens), the student will be able to activate or inhibit the TH molecular pathway in <i>P. orbicularis</i> larvae. After the treatments, experiments in "multi-choice" tanks (Lecchini 2005) will permit the student to assess the impacts of a premature or delayed metamorphosis in:</p> <ul style="list-style-type: none"> (i) the morphological development from larvae to juveniles (i.e. alizarin-red staining to study the development of the bony skeleton) the habitat selection and recruitment (behavioral ecology) (ii) the sensory detection of conspecifics/predators (sensory ecology: visual, chemical and acoustic signals) <p>Team publications: Lecchini D., Shima J., Banaigs B and Galzin R. (2005). Larval sensory abilities and mechanisms of habitat selection of a coral reef fish during settlement. <i>Oecologia</i> 143:326-334. Lecchini, D., Mills, S., Brié, C., Maurin, R., Banaigs, B., 2010. Ecological determinants and sensory mechanisms in habitat selection of crustacean postlarvae. <i>Behavioral Ecology</i> : 599-607. I.F. 3.224. Laudet V. (2011). The origins and evolution of Vertebrate metamorphosis. <i>Current Biology</i> 21:726-737. Lecchini D., Waqalevu V.P., Parmentier E. and Radford C.A. (2013). Fish larvae prefer coral over algal water cues: implications of coral reef degradation. <i>Mar. Ecol. Prog. Ser.</i> 475:303-307. Lecchini D., Mills S.C. and Beldade R. (2014). Reproduction and Larval Recruitment. In: Parmentier E. & Frederich B (eds). <i>Damselfishes in coral reefs</i>. In press.</p>	<p>David Lecchini (Professor at CRIOBE, lecchini@univ-perp.fr) in collaboration with Vincent Laudet (Professor and Director of Institut de Genomique Fonctionnelle de Lyon" (IGFL), vincent.laudet@ens-lyon.fr), in the context of the doctoral project of Marc Besson (CRIOBE).</p>	<p>"Centre de Recherches Insulaires et Observatoire de l'Environnement" (CRIOBE - www.criobe.pf) in Moorea, French Polynesia.</p>		
					
<p>Fig 1: Larval stages of <i>Platax orbicularis</i>. Matt Wittenrich, University of Florida, Shedd Aquarium</p>					
					
<p>Fig 2: Juvenile stages of <i>Platax orbicularis</i>. Matt Wittenrich, University of Florida, Shedd Aquarium</p>					

Promoter analyses of alfa <input type="checkbox"/> and tubulin genes in P.lividus sea urchin		Prof. F. Gianguzza. Department STEBICEF Section of Cell Biology School of Biology – University of Palermo (Italy)			all the basic techniques of molecular biology
Cadmium-induced stress response and autophagy or apoptosis in developing sea urchin embryo as a model system	<i>embryo culture, Western blot and immunolocalization, TUNEL and apoptosis assays, techniques to monitor autophagy</i>	Prof. M.C. Roccheri Department STEBICEF Section of Cell Biology School of Biology – University of Palermo (Italy)			
Analysis of bacterial communities of a hydrocarbon contaminated harbor	<i>Basic microbiology; Enrichment cultures; PCR; 16S rRNA gene clone libraries; degradation assays</i>	Dr P. Quatrini Department STEBICEF - Laboratory of Environmental Microbiology School of Biology – University of Palermo (Italy)			
Effects of climate change on the ecology of phyto- and zooplankton (including large branchiopods) in Mediterranean temporary ponds.	The potential impact exerted on the biota of temporary ponds by increased average temperatures, and concentration of precipitation over shorter periods, is investigated in our lab. In particular, we are interested in the shift, replacement and invasion of phyto- and zooplankton species. Special emphasis is given to the physical forcing which constraints plankton abundance and structure in these peculiar Mediterranean ecosystems. (<i>Samplings and measurements in the field. Species identification and morpho-functional groups. Data processing and interpretation. Multivariate statistic.</i>)	Prof. L. Naselli Flores Department STEBICEF – Laboratory of Hydrobiology and Phycology School of Biology – University of Palermo (Italy)			
The phytobenthic communities of the intertidal and upper infralittoral zones	Research activity deals with several aspects of Biology and Systematic of benthic algae, with special attention to communities inhabiting the Sicilian coasts. Attention is also paid to alien species and to the effects of their presence on indigenous communities. (Samplings in the field. Species identification. Data analysis)	Dr. A.M. Mannino Department STEBICEF – Laboratory of Hydrobiology and Phycology School of Biology – University of Palermo (Italy)			
Evolution of innate and adaptive immune responses, with particular focus on cellular and	Ontogeny of the innate immunity and environmental stress in marine invertebrates. The actual research interests include, fish adaptation physiology and immunity; Stress and immunomodulation indicators due to the social behaviour; genomics applications on fish welfare. Research topics: -expression and upregulation of collagen, phenoloxidasas, galectins, Interleukin MIF and TNF (real time	Prof. M. Cammarata Department STEBICEF - Laboratory of Marine Immunobiology School of Biology –			

molecular aspects of the inflammatory acute phase	PCR, in situ hybridization, recombinant proteins, histochemistry, immunohistochemistry, TEM, SEM); -cytotoxic hemocytes in invertebrates; -lectins, lysins, opsonization, cytotoxicity, phagocytosis, encapsulation; -fish cellular and humoral lectins (biochemical analysis, affinity column separation, HPLC); -antimicrobial peptides in molluscs and fish, stress response in fish (biochemical properties; RIA, ELISA), -glucocorticoid receptors in fishes (biochemical characterization and cloning). Stress and immunomodulation indicators Fish social behaviour and application in the farm welfare	University of Palermo (Italy)			
Animal ecology and distribution of Mammals and Birds; - Conservation Biology of Mediterranean Vertebrates;	Field monitoring in sample-areas, methods of animal abundance detection, database implementation, Species Distribution Models and statistical analysis on populations). Focal species/groups: Diurnal and Nocturnal Bird of Preys; Small mammals	Prof. M. Sarà Department STEBICEF - Laboratory of Zoogeography and Animal Ecology School of Biology – University of Palermo (Italy)			
Zoology topics	- Marine species identification - Taxonomy of Crustacean Amphipods - Geometric Morphometrics - Population genetics and Phylogeography of aquatic species	Dr. S. Lo Brutto Department STEBICEF - Laboratory of Taxonomy School of Biology – University of Palermo (Italy)			
Zoology topics	Phylogeography of terrestrial and marine species Animal Phylogeny and Taxonomy Population genetics of Terrestrial and Marine Animal Species Biology and population dynamics of fishes and crustaceans (decapoda) Stock Assessment of Marine Species (Fishes and Crustaceans) (morphological and molecular methodologies, biometry, otolith analysis, histology of gonads)	Prof. M. Arculeo Department STEBICEF - Laboratory of Taxonomy School of Biology – University of Palermo (Italy)			
Topic: Marine Biochemistry	Biochemical markers of stress, oxidative stress and apoptosis in vitro (fish cell lines) and in vivo (fish larvae) Individuation, isolation and characterization of natural compounds extracted from marine organisms: antioxidant, antiaging, anticancer compounds: biological evaluation in vitro. Biochemical indicators of product and process quality in marine resources utilization (fishery and aquaculture) <i>(cell culture, protein assay, colorimetric assay for cellular growth and survival cytotoxicity; cell death assay; fluorescence and immunofluorescence microscopy; western blot analysis; agarose gel electrophoresis; proximate composition determination; gas chromatography FID and MS; NIR spectrophotometry; Super critical fluid extraction, separation and concentration; HPLC; spectrofluorimetry; marine sediment characterization; marine water analysis)</i>	Dr. C. Messina - Dr. A. Santulli Department of Earth and Marine Sciences (STeM). Laboratory of Marine Biochemistry (Trapani) School of Biology – University of Palermo (Italy)			

<p>Topic: Aquatic ecology</p>	<p>Utilization of advanced acoustic systems for monitoring and managing the aquatic environment <i>(morphological surveys of the depth of coastal line - Integrated Multibeam System - Side Scan Sonar (MBES) - Sub Bottom Profile - Remotely Operated Vehicle (R.O.V.)</i></p>	<p>Prof. S. Calvo Department of Earth and Marine Sciences (STeM) - Laboratory of Aquatic Ecology School of Biology – University of Palermo (Italy)</p>			
<p>Topic: Marine Biology and Sea Resources</p>	<p>- Formulation of innovative feedstuffs for aquaculture - tutor: Prof. A. Mazzola (mesocosm experiments for testing new feedstuffs) - Characterisation of physical, chemical and biological features in sediments destined to dredging - tutor: Prof. A. Mazzola (elemental analyser, spectrophotometer, gas-chromatography, inductively coupled plasma- optical emission spectrometry) - Restoration of degraded marine coastal areas: effects on ecosystem structure and functioning – tutor: Dr. S. Vizzini (elemental analyser, isotope ratio mass spectrometer, inductively coupled plasma- optical emission spectrometry) - Biomagnification potential in a contaminated Mediterranean marine-coastal area tutor: Dr. S. Vizzini (elemental analyser, isotope ratio mass spectrometer, inductively coupled plasma- optical emission spectrometry, gas-chromatography) - Functional response of coastal marine ecosystems in a global change scenario: the model of a submarine shallow hydrothermal vent - tutor: Dr. S. Vizzini (elemental analyser, isotope ratio mass spectrometer, inductively coupled plasma- optical emission spectrometry)</p>	<p>-Department of Earth and Marine Sciences (STeM) – Laboratory of Marine Biology and Sea Resources School of Biology – University of Palermo (Italy)</p>			
<p>Study of Global climate changes effects on functional responses of marine communities through eco-physiological [metabolic] mechanistic models (rocky intertidal [marine rocky pools] and soft bottoms habitats [ponds, coastal lakes and lagoons])</p>	<p>1) the study of eco-physiological performances of organisms belonging to different functional groups (e.g., primary and secondary consumers such as bivalves, crabs and fish) both in field and under mesocosms conditions at varying physical [temperature; irradiance], chemical [salinity] and trophic factors [food availability]. (Methods: clearance rate [Coulter Counter], respiration rate [Stratkelvin], excretion rate [colorimetric]; heart beat rate [non-invasive cardioplethysmographich technique]; analysis of food availability: total organic matter, chlorophyll-a, lipid, carbs and proteins). 2) translating eco-physiological data into mechanistic bioenergetic models (Method: Dynamic Energy Budget (DEB) parameterisation)</p>	<p>Prof. G. Sarà Department of Earth and Marine Sciences (STeM) - Laboratory of Experimental Ecology and Behaviour (LoEEB) School of Biology – University of Palermo (Italy)</p>			

Topic: Marine Ecology	<p>Process implicated in the dynamic and structure of benthic rocky communities and on the invertebrate reproductive ecology.</p> <p>Effects of protection on fish assemblages, benthic communities and their controlling processes within Mediterranean MPAs.</p> <p>Reproductive ecology of echinoderms and sea slugs.</p> <p><i>Field activities of the laboratory encompass: sampling on mobile fauna and benthic assemblages with visual census, experimental catches and photographic techniques and manipulation experiments to detect the predation effect on sea urchins species, grazing effect on benthic assemblages and tagging experiment to study invertebrate movement patterns.</i></p>	Dr. P. Gianguzza Department of Earth and Marine Sciences (STeM) – Laboratory of Marine Ecology School of Biology – University of Palermo (Italy)			
Development of genomic tools for the study of marine predator-prey interactions	Understanding the marine food web structure requires discerning predator-prey relationships. In fish, these relationships are studied by visual identification of the prey species found in predator stomachs. Yet, this method is time consuming and it does not prove effective to detect early developmental stages (eggs, larvae) or semi-digested preys. This project aims at developing genomic based tools (DNA barcoding) as a more practical and accurate alternative for identification of prey species in fish stomachs. The candidate will be involved in the laboratory work and in the bioinformatic analysis of the data.	Naiara Rodríguez-Ezpeleta (nrodriguez@azti.es)	Marine Research Division, AZTI-Tecnalia, Sukarrieta (Bizkaia)		Bachelor Degree in Biology, Biochemistry, Environmental Sciences, etc.
Studies of pre-fattening of oysters in open marine waters	The European flat oyster (<i>Ostrea edulis</i>) is an autochthonous species in the Basque Country. This project aims to evaluate the feasibility of pre-fattening and fattening oysters in offshore aquaculture in the Basque coast. It will include the assessment of growth and mortality rates in <i>Ostrea edulis</i> as well as in <i>Crassostrea gigas</i> .	Diego Mendiola (dmendiola@azti.es)	Marine Research Division, AZTI-Tecnalia, Pasaia (Gipuzkoa)		Bachelor Degree in Biology Statistics
Spatial distribution model for the Atlantic Mackerel, implications within the context of climate change	The objective is to build spatial distribution models for the Atlantic Mackerel using existing data of the species presence, climatic and environmental GIS layers, in R language. In particular, suitable areas for spawning and juvenile and adult stages will be defined with this ecological niche approach. The potential impacts of climate change on the distribution of this species will be assessed, based upon the habitat model and literature review.	Guillem Chust (gchust@azti.es) and Paula Alvarez (palvarez@azti.es)	Marine Research Division, AZTI-Tecnalia, Sukarrieta (Bizkaia)-Pasaia (Gipuzkoa)		Bachelor Degree in Biology or Marine Sciences
Use of system dynamics models in studying the effects of restoring estuaries on the recovery of ecosystem services	Restoration of habitats in estuaries and coasts is likely increasing the ecosystem services they provide. Using the case of the Nervion estuary, we want to use dynamic models (e.g. VENSIM) to build scenarios of ecosystem services recovery after restoration of the estuary. This could serve to managers for taking decisions on which measures take for improving the quality of marine systems and increase the services delivered	María C. Uyarra (mcuyarra@azti.es) and Angel Borja (aborja@azti.es)	Marine Research Division, AZTI-Tecnalia, Pasaia (Gipuzkoa)	Related to the European Project MARS (2014-2017)	Degree in Biology, Marine Sciences, Environmental Sciences, etc. Knowledge on dynamic models (VENSIM or similar), GIS, ecosystem modelling, statistics, informatics
Assessing the environmental status of marine waters, within the Marine Strategy Framework Directive: testing different tools	In the EU project DEVOTES we have developed methods of biodiversity assessment for the Marine Strategy Framework Directive. In addition, other methods have been developed elsewhere (e.g. Ocean Health Index). Our intention is, using data from one or several DEVOTES pilot areas, determine the status using two or three methodologies and compare pros and cons of the methods in the results	Angel Borja (aborja@azti.es) and María C. Uyarra (mcuyarra@azti.es)	AZTI-Tecnalia, Marine Research Division, Pasaia (Gipuzkoa)	Related to the European Project DEVOTES (2012-2016)	Bachelor Degree in Biology, Marine Sciences, Environmental Sciences, etc. High level of GIS, databases, statistics and R programming

Estimation of Atlantic bluefin tuna (<i>Thunnus thynnus</i>) age and growth from otolith microstructures.	Otoliths of Atlantic bluefin tuna collected over three year period will be prepared to be examined using light microscope. The increments appear under the microscope as concentric rings which are alternately clear (continuous zones) and dark (discontinuous zones). Each pair forms a daily growth increment. The student will estimate the age of bluefin tuna by counting the daily increments and will determine if interannual variation exists in the growth rate of juvenile bluefin tuna.	Igaratza Fraile (ifraile@azti.es) and Haritz Arrizabalaga (harrizabalaga@azti.es)	AZTI-Tecnalia, Marine Research Division, Pasaia (Gipuzkoa)		Degree in Biology or Marine Sciences Experience with otolith handling is desirable but not compulsory. Knowledge and/or hands-on experience with optical microscope and digital imaging techniques is desirable.
Sex ratio variations in copepod species from two Basque estuaries showing different level of pollution.	This study aims to describe seasonal and year-to-year variations of the sex ratio of copepod species inhabiting Basque estuaries in relation to water quality. It is known that several environmental contaminants, defined as endocrine disrupting compounds, are able to interact with the endocrine systems of aquatic organisms altering their reproduction and sexual determination and differentiation processes. Copepods are key invertebrate species in the marine and estuary zooplankton communities and the alteration in population structure and dynamic could compromise estuary health status. This research will be made by using available data from a 10-year time series of the estuaries of Bilbao and Urdaibai, which have a different history of pollution. The work will use computer based in silico tools to create time series of copepod sex ratios and to compare the fluctuations with environmental variables, such as temperature, salinity, dissolved oxygen and nutrients, and with contaminant loads (individually and in combination)	Fernando Villate (Fernando.villate@ehu.es) and Maren Ortiz-Zarragoitia (maren.ortiz@ehu.es)	Department of Ecology and Plant Biology; Cell Biology in Environmental Toxicology (CBET) Research Group and Plentzia Marine Station, UPV/EHU.	Consolidated research group CBET, unit of formation and research Ecosystem Health Protection	interest in Marine Biology and Marine Ecology.
Effects of acidification on mussel gamete viability	The present work aims to study the effects of acidification on mussel gamete development and viability. It is known that acid environments can disrupt fertilization and embryo development in shellfish such as sea urchins. Mussels, used worldwide as sentinel organisms of marine ecosystem health, offer a good opportunity to study acidification processes, as recently found to be sensitive to high pCO ₂ . Transcriptome level changes have been reported in mussels subjected to acidic environment and poor adhesion strength to substrates. Together with assessing gamete development and quality, core health status biomarkers will be studied to evaluate adult stress after exposure to acidic environment. This work offers the opportunity on learning on fertility and fecundity techniques together with introducing the student on the evaluation of changes in the environment to marine organisms.	Urtzi Izagirre (urtzi.izagirre@ehu.es) and Maren Ortiz-Zarragoitia (maren.ortiz@ehu.es)	Cell Biology in Environmental Toxicology (CBET) Research Group, Plentzia Marine Station, UPV/EHU.	BMW research project, consolidated research group CBET, unit of formation and research Ecosystem Health Protection	interest in Cell Biology and animal physiology.
An <i>in vitro</i> assay to assess effects of pharmaceuticals in mussel gonads explants.	This works aims to establish a protocol to work <i>in vitro</i> with mussel gonad explants in toxicology studies. Mussels are worldwide used as sentinels of marine pollution but few <i>in vitro</i> assay protocols, out of those based on hemocytes, exist. Pharmaceutical compounds are growing in concern due to the increase presence in the aquatic environment and their potent activity as hormonal compounds. Thus, they can interact with hormonal receptors and pathways within cells. We propose the adaptation of existing protocols with fish tissue explants using mussel mantle/gonad tissue as promising target for ecotoxicological studies. This will offer the possibility of testing several contaminants in short bioassay systems and try to understand potential mechanisms altered by pharmaceuticals in mussel gonad cells. Endpoints to be included in the bioassay will be selected based on a directed bibliography revision. As possible starting candidates vitellogenin synthesis (biomarker of exposure to xenoestrogens) and antioxidant enzyme activities (catalase, superoxide dismutases and glutathione peroxidase) are suggested.	Maren Ortiz-Zarragoitia (maren.ortiz@ehu.es) Miren P. Cajaraville (mirenp.cajaraville@ehu.es)	Cell Biology in Environmental Toxicology (CBET) Research Group, Plentzia Marine Station, UPV/EHU.	Consolidated research group CBET, unit of formation and research Ecosystem Health Protection	interest in Cell Biology
Effects of selected antidepressant pharmaceuticals on male fish courtship aggressiveness.	The concern about the environmental impact of antidepressant pharmaceuticals is growing due to their overuse in modern societies. Their presence in the aquatic environment is not actually at high level, but they concentration have increased in the last years. Hot spots such effluents of sewage treatment plants, they could result in alterations to local organisms affecting at neuroendocrinological level. This work aims to assess the impact on courtship behaviour of selected antidepressant compounds using zebrafish as experimental model. Zebrafish, placed in 2x2 breeding colonies, will be examined before and after treatment to establish changes occurring in the aggressive response of	Maren Ortiz-Zarragoitia (maren.ortiz@ehu.es)	Cell Biology in Environmental Toxicology (CBET) Research Group, Plentzia Marine Station, UPV/EHU.	Consolidated research group CBET, unit of formation and research Ecosystem Health Protection	interest in Cell Biology

	dominant individuals. Together with behavioural responses, transcription levels of male and female dominance-related genes in the brain will be quantified by qPCR.				
Characterization of vertebrate-like neuropeptide and amine hormones in mussels (<i>Mytilus galloprovincialis</i>).	Bivalves is one of the largest taxonomic groups among animals but their endocrine system is poorly understood. Molecules controlling gametogenesis have not been completely characterized and thus, an effort should be done in order to elucidate the mechanism controlling reproduction in this important animal group. Steroids have been isolated from bivalve tissues but recent works propose that they do not directly participate in the regulation of gametogenesis in mollusks and a potential involvement of peptide hormones has been suggested. The aim of this work is to assess the transcription levels of vertebrate-like gonadotrophin-releasing hormone (GnRH) in mussel gonad tissue at different stages of the reproductive cycle. Furthermore, other non-peptide neurotransmitters such as serotonin and dopamine will be also evaluated as potential communication molecules participating in the control of gametogenesis in mussels.	Maren Ortiz-Zarragoitia (maren.ortiz@ehu.es)	Cell Biology in Environmental Toxicology (CBET) Research Group, Plentzia Marine Station, UPV/EHU.	Consolidated research group CBET, unit of formation and research and Ecosystem Health Protection	interest in Cell Biology
Biological responses to contaminants in common sole (<i>Solea solea</i>)	Environmental pollution and its effects on the health of aquatic ecosystems is a problem of great concern in recent years. Exposure to pollutants on marine teleost can trigger a broad range of histopathological changes to multiple organs, in a short-medium time range. Therefore, the aim of this study is to develop and apply existing biomarker methods (histopathology, lysosomal responses and micronuclei frequency) to explore cause-effect relationship in a laboratory experiment of exposure to model pollutants (Cd and B(a)P) in the common sole, <i>Solea solea</i> . For that purpose, common soles will be exposed to low, medium and high doses during 3 and 27 days. These results will enable to characterize the mechanism of pollutants under control conditions and will provide relevant information for future biomonitoring studies.	Izaskun Zorita (izorita@azti.es) Urtzi Izagirre (urtzi.izagirre@ehu.es)	AZTI-Tecnalia (Pasaia, Gipuzkoa) PIE (Plentzia, Bizkaia)	Plan Nacional	Knowledge on histology
Health status of common sole (<i>Solea solea</i>) exposed to contaminated sediments	Sediments are a major sink of the contaminants entering estuaries and coastal systems. They represent a potential ecological risk, as they can act as a source of persistent inorganic and organic contaminants to the water column. This is of special concern in common sole (<i>Solea solea</i>), a benthic fish that inhabits Basque estuaries frequently impacted by hazardous substances. In order to explore cause-effect relationship, common soles will be exposed to 3 different sediment concentrations (control, low and high) during 3 and 27 days. For each experimental group a set of histological level biomarkers (histopathology, lysosomal responses and micronuclei frequency) will be analyzed and finally, biological responses will be integrated with bioaccumulation levels of pollutants.	Izaskun Zorita (izorita@azti.es) Urtzi Izagirre (urtzi.izagirre@ehu.es)	AZTI-Tecnalia (Pasaia, Gipuzkoa) PIE (Plentzia, Bizkaia)	Plan Nacional	Knowledge on histology
Sulfur content of <i>Posidonia oceanica</i> leaves	We hypothesize that in <i>Posidonia oceanica</i> sulfur containing molecules can be used either as oxygen radical scavengers (under high irradiance), or as antifouling molecules for epiphytes, or as grazer deterrent. Content and distribution of sulfur containing molecules will be investigated by a combination of field work and laboratory analysis. Preference for candidates with basic skills in chemical laboratory analysis and diving licence.	Alberto Borges (alberto.borges@ulg.ac.be)	Chemical Oceanography Unit, AGO, University of Liège, Liège, Belgium (http://www.co2.ulg.ac.be/)		Strong interest in ocean biogeochemistry; handy in lab wok
Development of tools for managing the Good Environmental Status of the Ocean. Application to the Mediterranean basin. Coastal ecosystems are under the combined influences of climate and anthropogenic pressures. The assessment and differentiation of the impact of these pressures on marine ecosystems environmental status, and on their ability to fulfill their ecological functions require the development of adequate interdisciplinary tools. Ideally these tools should provide the means to define management strategies that would preserve or restore the good environmental status of marine ecosystems. The different subjects of master thesis are related to the development of such tools/methodologies:		Marilaure GRÉGOIRE (mgregoire@ulg.ac.be)		Oceanology, University of Liège, Liège, Belgium (http://www2.ulg.ac.be/oceanbio/Recherche_ENG.htm)	
Assessing the imprints of punctual pollution sources	Identification of marine sub-regions particularly sensitive to punctual pollution sources by implementing appropriate diagnostics of water age, residence time and connectivity in an existing circulation model. These diagnostics will allow to identify regions of accumulation of pollutants and then to connect this information with the characteristics of the benthic habitat (the student will have to run an existing 3D hydrodynamical model).				the student will have to run an existing 3D hydrodynamical model
Linking the composition of marine macrobenthos with local environmental composition.	Collected field samples on macrobenthos composition, bottom water and sediment cores composition are analyzed. The local composition of the macrobenthos (taxonomic and functional) is linked through local environmental conditions using statistical tools (canonical correlation analysis). Several indices of diversity have to be computed and compared (Biologist/chemist).				statistical tools (canonical correlation analysis). Several indices of diversity have to be computed and compared (Biologist/chemist).
Assessing the spatial distribution of benthic assemblages by identifying and mapping	In this master thesis, the local information obtained from the analysis of punctual samples (realized in the previous subject) will be upscaled using the environmental conditions provided by an existing three dimensional circulation-biogeochemical model. This will allow mapping benthic habitat characteristics at the scale of the continental shelf. (the student will have to run an existing 3D hydrodynamical-biogeochemical model).				the student will have to run an existing 3D hydrodynamical-

their environmental niches.					biogeochemical model.
Fisheries Management: Black Sea's anchovies stocks	Black Sea's anchovies stocks have been drastically reduced (90%) in the late 80's. The predation by and competition with the invasive ctenophore Mnemiopsis is a likely reason for this collapse. An hypothesis that could explain why this sudden shift occurred in the late 80's while Mnemiopsis was present in the Black sea for almost a decade is the impressive modification of the Black Sea circulation and physical features induced by persistent atmospheric anomalies in these years. Such events may have affected the residence time of anchovy's larvae in their usual nursing grounds (the Black Sea north western shelf) and affected the larval survival and recruitment rate. We propose to investigate the effect of climatic variations on the dispersal patterns of larvae through lagrangian experiments. These consist in exploiting existing circulation fields derived from an existing and running 3D circulation models to compute the trajectories of punctual particles. Eventually this approach may be complemented by including a growth model representing the effect on the larval growth of the environmental conditions encountered along its trajectory. (the student will have to run an existing 3D hydrodynamical model).				the student will have to run an existing 3D hydrodynamical model
Modelling of the Circulation in the Calvi Bay (Corsica, France).	Since 30 years, the Liege University has access to a Marine Research Station (STARESO, http://www.stareso.com/) in the Calvi Bay where pluri-disciplinary data are collected and stored in a database since several years. This place is considered a reference unperturbed site where a large a Posidonia meadow can be found until ~40m depth. The management of the resources of the Bay requires the development of a mathematical model coupling the hydrodynamics and biogeochemistry. This model has to be at high resolution since it has to be able to simulate coastal processes. The master thesis consists in implementing such a model first the physical part) starting from an initial configuration. The master thesis consists in implementing such a model first the physical part) starting from an initial configuration. (STARESO, http://www.stareso.com/)				the student will have to run an existing 3D hydrodynamical model
Linking Biodiversity and ecosystem services using a trait based approach	Marine organisms provide a wealth of services to humans. The Millennium Assessment report classified these services among different categories which are "Provisioning services" (Products obtained from ecosystems, e.g. food, medical resources, biotechnology resources, energy), "Regulating services" (Benefits obtained from regulation of ecosystem processes, e.g. climate regulation, organic waste processing), "Cultural services" (Nonmaterial benefits obtained from ecosystems e.g. recreation, culture, tourism), and "Supporting Services" (Support services: Services necessary for the production of all other services, e.g. Primary production, Oxygen production, Nutrient Cycling). Using existing collected data on macrobenthos biomass and abundance (Calvi bay and Black sea), the aim of the master thesis consists in assessing the services delivered by the benthic ecosystem through a biological trait analysis of its species. The traits will be selected to be linked with the investigated services. Once the different traits are determined for each dominant species of the investigated communities, statistical analysis will be performed in order to assess the functional diversity of each community and between communities. The diversity between sites will be explained in terms of variability of environmental variables (e.g. substrate composition, organic matter content and composition). Correlations between the different types of traits (e.g. traits related to different processes, sensitive traits and traits related to ecosystem services) will also be determined. Communities including species with traits that are important for the delivering of ecosystem services to humans will be identified and compared with regions of high diversity.				(en collaboration avec Stareso: Corinne Pelapra et Annick Donnay)
Study of the biological features of Posidonia oceanica intermattes: a comparison between natural and anchoring induced structures.	The Mediterranean seagrass Posidonia oceanica plays an important role in controlling coastal belowground biogeochemistry, in particular by oxidizing sediments through the release of O ₂ by roots. This process allows creating more suitable condition for plant growth and colonization. Intermattes are patches of sand or dead matte in continuous meadows of the seagrass Posidonia oceanica. These structures can be natural or induced by human activities like anchoring in the case of this study. The aim of this master thesis is to compare the biological features of the meadows surrounding these two types of intermattes. Biological features investigated are: The growth and primary production by using lepidochronology The leaves biometry The chlorophyll, carbon, nitrogen, phosphorus and iron contents in leaves, rhizomes and scales of the plant.	Sylvie GOBERT (Sylvie.gobert@ulg.ac.be)	Oceanology, University of Liège, Liège, Belgium (http://www2.ulg.ac.be/oceanbio/Recherche_ENG.htm)		

	Techniques: growth and primary production by using lepidochronology, The leaves biometry- The chlorophyll, carbon, nitrogen, phosphorus and iron contents in leaves, rhizomes and scales of the plant				
TRANSsfer of microPOLutants (TEs, TBT, POPS et HAPs) from sand to trophic food chains in the MEDiterranean coastal areas : TransPoIMed	All pollutant inputs in the environment are finally discharged in the oceans and accumulated into the sediment (colonized by particular fauna and flora, starting point of trophic food webs) This project aims to estimate the transfer of micropollutants from the sediment towards species of different trophic levels as the sea cucumber (soft bottom feeder), a sea urchin (grazer), the red mullet and the red scorpion fish (first and second-class carnivorous).	Sylvie GOBERT (Sylvie.gobert@ulg.ac.be)	Oceanology, University of Liège, Liège, Belgium (http://www2.ulg.ac.be/oceanbio/Recherche_ENG.htm)		Interest in ecotoxicology, lab work
STation of Reference and rEsearch on Change of local and global Anthropogenic Pressures on Mediterranean Ecosystems Drifts: 30 years of physico-chemical and biological data , relations with actual status of the bay	Since 30 years, the Liege University has access to a Marine Research Station (STARESO, http://www.stareso.com/) in the Calvi Bay where pluri-disciplinary data are collected and stored in a database (RACE: more than 5 millions of data). This place is considered a reference unperturbed site in the Med Sea. The aim of this master thesis will be to put in evidence the evolutions (or unmodified status) of the different measured parameters (nutrients, primary producers..) and the correlation, linked to the status of the bay (small scale) or in relation with climate changes, NAO... (large scale) (seawater temperature, winds...).	Sylvie GOBERT (Sylvie.gobert@ulg.ac.be)	Oceanology, University of Liège, Liège, Belgium (http://www2.ulg.ac.be/oceanbio/Recherche_ENG.htm)		Long journey in STARESO (5 months)
Trace elements and stable isotopes in vibrissae fom South American Sea lions		Krishna Das: krishna.das@ulg.ac.be	Oceanology, University of Liège, Liège, Belgium (http://www2.ulg.ac.be/oceanbio/Recherche_ENG.htm)		lab work
Endocrine disrupters in fish		Joseph Schnitzler and Krishna Das: joseph.schnitzler@ulg.ac.be	Oceanology, University of Liège, Liège, Belgium (http://www2.ulg.ac.be/oceanbio/Recherche_ENG.htm)		Interest in in vivo exposure, lab work
Upper layer currents in the central Arctic Ocean	The gross circulation of the upper layers of the Arctic Ocean is known from water mass properties: the mixed layer, containing fresh water from the shelf seas, travels from Siberia towards the Atlantic sector, and the saline and warm layer of Atlantic origin below follows cyclonic pathways along topographic features. Direct observations of the flow below the sea ice are however difficult to obtain and thus poor. Data set: A unique time series/section from a drifting ADCP in combination with a CTD profiler has been obtained. It provides data capturing velocity and hydrography (temperature / salinity) of the lower mixed layer and the Atlantic layer in the central Arctic Ocean. Scope: The goal of the thesis is to evaluate these data with respect to the mean and fluctuating velocity structure, its relation to forcing through ice /wind drag and/or the residual, possibly through geostrophy.	Prof. Ursula Schauer and Dr. Benjamin Rabe Tel: +49 (0)471-4831-2913 Fax: +49 (0)471-4831-1797 email: torsten.kanzow@awi.de	Alfred-Wegener-Institute Helmholtz Centre for Polar and Marine Research Bussestraße 24 27570 Bremerhaven Germany		
Microalgae from ballast waters	Exchange of water through ships' ballast waters has been regarded as an important means of organisms' dispersal. For this reason, different technologies to treat the ballast water and prevent the introduction of alien organisms are being implemented. In this study the presence of microalgae in ballast water of ships that dock in the Bilbao Harbor will be checked and, when present, they will be characterized through different approaches.	Aitor Laza (aitor.laza@ehu.es); Sergio Seoane (Sergio.seoane@ehu.es); Emma Orive (emma.orive@ehu.es)	Dept of Plant Biology and Ecology UPV/EHU, Leioa.		
Assessing the toxicity of the dinoflagellate genus Coolia	For many years, Coolia monotis, the type species of its genus, has been considered potentially toxic. However, last analyses of C. monotis strains from European and Mediterranean waters showed no toxicity, giving rise to the question of its status as a potentially toxic species. A recent sampling in the Canary Islands revealed an unexpected	Aitor Laza (aitor.laza@ehu.es); Sergio Seoane (Sergio.seoane@ehu.es);	Dept of Plant Biology and Ecology UPV/EHU, Leioa.		

	diversity of <i>Coolia</i> species. Different strains from 7 species were isolated in culture, making it possible to check their toxicity through brine shrimp bioassays. It can be hypothesized that part of the discrepancy concerning the toxicity of different strains identified as <i>C. monotis</i> is due to the presence of cryptic diversity within the genus.	Emma Orive (emma.orive@ehu.es)			
Interactive effects of elevated temperature, hypoxia and pollution on marine bivalves	Estuarine and coastal environments are experiencing increasing anthropogenic pressure due to the global climate change, hypoxia and pollution. These stressors can interactively affect survival and health of marine organisms; however, the physiological and molecular mechanisms of such interactions are poorly understood limiting our ability to assess the consequences and environmental risks of the global climate change and pollution in estuarine and coastal ecosystems. In this project, we will explore the molecular and physiological responses of marine bivalves (oysters and scallops) to single and combined stressors (warming, hypoxia and trace metals) focusing on energy metabolism as the key integrative function that determines performance and survival. We will integrate molecular (gene expression and activities of key metabolic enzymes) and cellular (assessment of mitochondrial function and cellular energy balance) responses to these stressors and link them to the whole organism fitness related parameters (survival, immune function and stress tolerance). The student will learn a broad selection of molecular, biochemical and physiological techniques as well as statistical analyses and will apply this knowledge to address a fundamental physiological question - understanding the mechanisms of stress tolerance in marine organisms. The research findings will provide insights into the environmentally realistic effects of multiple stressors and will have implications for conservation and resource management of estuarine and coastal ecosystems by providing a mechanistic framework for health assessment of bivalves that serve as sentinels for the ecosystem health.	Inna Sokolova, isokolov@uncc.edu	Department of Biological Sciences, University of North Carolina at Charlotte, Charlotte, NC, 28223	UNC Charlotte and U.S. CRDF	
Spatio-temporal distribution of parasites in the mud shrimp <i>Upogebia pusilla</i> and impact on its fitness	The mud shrimp <i>Upogebia pusilla</i> is a common sediment dweller in intertidal flats of Arcachon Bay. A part from its significant place on the trophic web, the anomouran crustacean is supposed to play an important role on benthic biogeochemistry cycles. Our hypothesis is that the activity/fitness of the mud shrimp could be altered by its infection by different parasites. This study aims: 1) assessing spatio-temporal infection of <i>U. pusilla</i> ; 2) evaluating the effect of epicaridean parasites on host fitness and metabolism and 3) elucidating the phenology of the involved trematode parasites. KEYWORDS: host-parasites systems, intertidal ecology, respiration, parasite cycles, molecular biology	Xavier de MONTAUDOUIN, PhD Associated Professor –HDR x.de-montaudouin@epoc.u-bordeaux1.fr & Alexia LEGEAY, PhD Associated Professor	UMR EPOC 5805 University Bordeaux 1 – Marine Station at Arcachon, France	Local funding (Adera)	Good background and interest in marine biology, fitness for mudflat sampling!
Distribution and dynamics of Se and Te in the Gironde Estuary.	The project is a part of the AMORAD project (French national project on radionuclide security), which aims at investigating/predicting possible radionuclide transport to the sea in case of an accident (type Fukushima) in France. We will work on stable nuclides of the same elements for which radioactive nuclide emissions would be expected in case of a crisis. These stable nuclides have the same chemical behavior as the respective radionuclides, which is (especially for Te) widely unknown for estuarine conditions. The Master project aims at setting up an analytical method and analysing dissolved and particulate Se, Te in the salinity gradient of the Gironde. A first attempt of estimating gross/net fluxes will be done and if there is enough time we may also do some analyses in oysters.	Jörg Schaffer jorg.schafer@u-bordeaux.fr	UMR EPOC 5805 University Bordeaux 1		
Impact of ocean acidification in parasite-host interactions: manipulation of hosts by parasites		Robert Poulin	University of Otago (New Zealand)		
Effects of dietary exposure to Ag nanoparticles on mussels <i>Mytilus galloprovincialis</i>: histopathology,	This master thesis is part of the ongoing research project Nanosilveromics, funded by the Spanish Ministry, which aims to gain deeper knowledge on the mechanisms of action and toxicity of Ag nanoparticles (NPs) to aquatic organisms at environmentally relevant Ag NP concentrations. For this, the model bivalve species <i>Mytilus galloprovincialis</i> has been exposed to Ag NPs through the diet (contaminated algae) for 21 days in two different seasons (winter and spring), to compare the responses of mussels at different seasons and reproductive stages. The master student will determine responses at the histological level in paraffin embedded sections, specially focusing on	Miren P. Cajaraville (mirenp.cajaraville@ehu.es) and Eider Bilbao (eider.bilbao@ehu.es)	Cell Biology in Environmental Toxicology (CBET) Research Group, UPV/EHU, Leioa and Plentzia	Nanosilveromics research project, consolidated research group CBET, unit of formation and research Ecosystem	

reproductive alterations and embryotoxicity	histopathological alterations in the digestive gland and gonad tissue. The bioavailability of Ag at cell and tissue level will be also assessed applying an autometallographical technique. Further, in spring 2015 the student will be involved in running a new experiment where gametes from exposed individuals will be studied and assayed for fertilization success. Results obtained will suppose a step forward in environmental risk assessment of Ag NPs.			Health Protection	
Sequencing of vitellogenin gene in mussel <i>Mytilus galloprovincialis</i> and seasonal variations in transcription levels	In vertebrates, vitellogenin (Vtg) is the egg yolk protein synthesized in females under estrogen regulation. Some emerging environmental pollutants called endocrine disruptors mimic estrogenic hormones and cause feminization of aquatic organisms, giving rise to induction of Vtg expression in juvenile and male organisms. In recent years, Vtg-like proteins have been measured in mussels using an indirect method, as a potential biomarker of exposure to endocrine disruptors. Further, a partial sequence of Vtg mRNA was recently sequenced in our laboratory. The aim of this master thesis project is to sequence the whole gene of Vtg using gene walking and to develop specific molecular tools in order to characterize the seasonal variations in transcription levels of Vtg along an annual reproductive cycle. Obtaining the whole DNA sequence of the Vtg gene will allow us to identify its regulatory regions and to understand the basis of regulation of transcription of this important gene. The work will be developed in the framework of a wider research line on the presence and impact of endocrine disruptors in estuaries of the Basque Country.	Miren P. Cajaraville (mirenp.cajaraville@ehu.es) and Maren Ortiz-Zarragoitia (maren.ortiz@ehu.es)	Cell Biology in Environmental Toxicology (CBET) Research Group, UPV/EHU, Leioa and Plentzia	consolidated research group CBET, unit of formation and research Ecosystem Health Protection	
A seasonal study of cancer and other histopathological alterations in cockles <i>Cerastoderma edule</i> from the Urdaibai Biosphere Reserve	Our research group has developed a research line on the mechanisms of carcinogenesis in aquatic organisms, especially devoted to explore potential linkages between cancer development and environmental contamination. In this context we recently discovered that cockles inhabiting the Urdaibai Biosphere Reserve are affected by hemic or disseminated neoplasia. The ethiology of disseminated neoplasia in bivalve molluscs is not known but has been generally associated to a possible viral infection, although environmental contamination could also contribute. The aim of this master thesis is to study the prevalence of disseminated neoplasia along the reproductive cycle of cockles, based on the screening of hemolymph samples and on the histopathological analysis of digestive gland and gonad tissues in different cockle populations of the Urdaibai Biosphere Reserve. Furthermore, tissue samples will be submitted to chemical analysis to measure levels of bioavailable priority and emerging contaminants. Some samples will be analyzed by TEM in order to search for possible viral infections.	Miren P. Cajaraville (mirenp.cajaraville@ehu.es)	Cell Biology in Environmental Toxicology (CBET) Research Group, UPV/EHU, Leioa and Plentzia	consolidated research group CBET, unit of formation and research Ecosystem Health Protection	
Analysis of the potential cytotoxicity of graphene oxide nanoparticles.	This master thesis is part of a project funded by the Basque Government ETORTEK programme on the safety for human and environmental health of different types of nanoparticles incorporated in consumer products. Specifically, the master thesis will focus on the potential cytotoxicity and mechanisms of toxicity of graphene oxide nanoparticles. Since NPs tend to end up in waterways and finally in the ocean, their uptake and effects in the marine biota represent a major concern. Due to their filter-feeding activity and well-developed endo-lysosomal system, mussels have been considered an important target for NP toxicity in the marine environment and thus, they represent a key species to evaluate NP toxicity. In the master thesis several cytotoxicity and functional in vitro tests well established in the laboratory will be applied using mussel hemocytes and gill cells primary cultures.	Miren P. Cajaraville (mirenp.cajaraville@ehu.es)	Cell Biology in Environmental Toxicology (CBET) Research Group, UPV/EHU, Leioa and Plentzia	consolidated research group CBET, unit of formation and research Ecosystem Health Protection	
Development of a microfluidic biological sensor for in-situ detection of marine organisms		Dr. Socrates Loucaides	NOCS		
Development of primary cell line from echinoderms, for studying nuclear envelope assembly	The nuclear envelope is an organelle of unique complex and dynamic structure, which serves not only as a physical barrier between the nucleus and the cytoplasm, but also as a regulator of many cellular events. Mutations in nuclear envelope proteins have been associated with a wide range of diseases, the most common of which are the laminopathies [1,2]. Structural alterations in nuclei have also been observed in many types of cancer, and are used as diagnostic markers [3]. However, how these changes contribute to disease pathology is still unclear. Advances in the understanding of the mechanisms involved in nuclear envelope dynamics will be important. We have studied the assembly of the nuclear envelope extensively in echinoderms and mammalian cells [3,4]. Currently we wish to develop a synchronous cell line from echinoderms that will not have the disadvantages of mammalian transformed cell lines. The selected candidate will also have the opportunity in learning how to work with	Banafshé Larijani	Cell Biophysics Laboratory, Unidad de Biofísica (CSIC-UPV/EHU). Sarriena s/n, 48940 Leioa, Spain.2 IKERBASQUE, Basque Foundation for Science Email: banafshe.larijani@ikerbasque		The selected candidate should have a good knowledge of cell biology and biochemistry as well as cell culture

	<p>a cell free assay reconstituting nuclear envelope assembly as well as using different types of imaging tools.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Shimi T, Butin-Israeli V, Adam SA, Goldman RD (2010) Nuclear lamins in cell regulation and disease. Cold Spring Harb Symp Quant Biol 75: 525-531. 2. Worman HJ, Ostlund C, Wang Y (2010) Diseases of the nuclear envelope. Cold Spring Harb Perspect Biol 2: a000760. 3. Zink D, Fischer AH, Nickerson JA (2004) Nuclear structure in cancer cells. Nat Rev Cancer 4: 677-687. 4. Larjani B, Poccia DL (2009) Nuclear envelope formation: mind the gaps. Annu Rev Biophys 38: 107-124. 5. Marie-Charlotte Domart, Tina M. C. Hobday, Christopher J. Peddie, Gary H. C. Chung, Alan Wang, Karen Yeh, Nirmal Jethwa, Qifeng Zhang, Michael J. O. Wakelam, Rudiger Woscholski, Richard D. Byrne, Lucy M. Collinson, Dominic L. Poccia and Banafshé Larjani (2012) Acute manipulation of diacylglycerol reveals roles in nuclear envelope assembly & endoplasmic reticulum morphology PLoS One 7(7):e40669 		.org URL : http://www.ikerbasque.net/banafshe.larjani		techniques.
Sediment Toxicity assessment using <i>Daphnia magna</i> Straus in streams affected by historical mining activities	<p>Mining works in the Nalon river basin (Asturias) is the source of heavy metal pollution of river sediments. The study aims to assess sediment chronic toxicity of several reference and polluted sites in the region using the cladoceran <i>Daphnia magna</i> Straus.</p>	<p>Pilar Rodriguez (pilar.rodriguez@ehu.es) & Maite Martinez- Madrid Z (maite.martinez@ehu.es)</p>	<p>Dept. Zoology and Cell Biology</p> <p>Dept. Genetics, Physical Anthopology and Animal Physiology, UPV/EHU, Leioa.</p>	Lab costs	Note: field work for sampling in September or October may be required.
Biodegradable Wave Energy Converter – BioFloat: 1.- Design/Industry Connections	<p>Structural failure will be the primary failure mode for wave energy devices. We don't want big metal floats drifting around. Here we propose to develop a concept for using biological material as the reactive body in wave energy converters. Essentially the reactive body should be bio-gradable. We seek to develop IP around the float/drag – not the converter itself.</p> <p>Q: Can a biological element be added to a WEC (wave energy converter)?</p> <p>Research</p> <p>Present designs – feasible to work with?</p> <p>How to implement biological work element?</p> <p>Does it affect Energy extraction?</p> <p>Economic analyses – advantages of biological drag?</p>	<p>Assoc. Prof. Craig Stevens Tel.: +64 4 386 0476 E-mail: c.stevens@niwa.cri.nz</p>	<p>New Zealand National Institute for Water and Atmospheric Research University of Auckland. Greta Point, Wellington. NIWA 301 Evans Bay Pde, Wellington, 6022.</p>		Christian Fischer. ok
Biodegradable Wave Energy Converter – BioFloat: 2- Biophysical Issues	<p>What species would work best?</p> <p>Options/Properties – what species are viable? Best morphology?</p> <p>Husbandry – how are they supplied?</p> <p>Attachment – how to get them attached?</p> <p>Impact issues – biosecurity aspects, different species in different regions?</p> <p>Economic side- benefit – can the species be sold?</p> <p>Methodology: Literature review. What's a WEC?. Biomimicry. Relevant biological issues – growth, longevity...</p> <p>Field experiments (combine with proj #2)</p> <p>Mock device</p> <p>Trial different species (using proxies?)</p> <p>Accelerometers, load cell & wave measurement(?)</p> <p>UW video analysis</p> <p>Quantitative economic analysis from biological perspective</p>	<p>Assoc. Prof. Craig Stevens Tel.: +64 4 386 0476 E-mail: c.stevens@niwa.cri.nz</p>	<p>New Zealand National Institute for Water and Atmospheric Research University of Auckland. Greta Point, Wellington. NIWA 301 Evans Bay Pde, Wellington, 6022.</p>		

Comparative study of the main zooplankton variability modes accounted by environmental variability	Multifactorial analysis of zooplanktonic and environmental data from time series to determine environmental forces that govern zooplankton variability patterns	Ibon Uriarte ibon.uriarte@ehu.es	Lab. of zooplankton ecology. Dept. of Plant Biology and Ecology, Faculty of Science and Technology, UPV/EHU, Leioa	Funding for the Project "Zooplankton response to climatic variability in the Northeast Atlantic Shelves Province in relation to latitude and eutrophy"	Graduate in Biology, Marine Biology or Environmental Sciences
Plankton phenology in relation to latitude and eutrophy	Application of phenological descriptors to the time series of zooplankton and chlorophyll to determine phenological changes associated to climate change	Arantza Iriarte a.iriarte@ehu.es	Lab. of zooplankton ecology. Dept. of Plant Biology and Ecology, Faculty of Science and Technology, UPV/EHU, Leioa	Funding for the Project "Zooplankton response to climatic variability in the Northeast Atlantic Shelves Province in relation to latitude and eutrophy"	Graduate in Biology, Marine Biology or Environmental Sciences
Comparative analysis of environmental and planktonic variability patterns and scales	Extraction of seasonal, interannual and residual variability patterns in environmental and planktonic variables by multiplicative models	Fernando Villate fernando.villate@ehu.es	Lab. of zooplankton ecology. Dept. of Plant Biology and Ecology, Faculty of Science and Technology, UPV/EHU, Leioa	Funding for the Project "Zooplankton response to climatic variability in the Northeast Atlantic Shelves Province in relation to latitude and eutrophy"	Graduate in Biology, Marine Biology or Environmental Sciences
Sexual determination in fish exposed to xenoestrogens		Ibon Cancio	Cell Biology in Environmental Toxicology (CBET) Research Group, UPV/EHU, Leioa and Plentzia	consolidated research group CBET, unit of formation and research Ecosystem Health Protection	