

EMBC+ INTERNSHIP CATALOGUE

ACADEMIC YEAR 2015-2016

Version 05 November 2015

CRYPTIC SPECIES AND THEIR ECOLOGY

Internship institute: Ghent University, Marine Biology Research Group

Supervisor: Drs. Nele De Meester (nele.demeester@ugent.be)

Number of students for this internship: 2

Description of the internship: Behind the morphological similarity of many species, a hidden genetic diversity can be found. This cryptic diversity has been well documented in the marine nematode *Litoditis marina*. Despite the growing knowledge about this cryptic diversity, little is known about the ecology of the different cryptic species. Differences in environmental preferences, decomposition processes, dispersal capacities and competition abilities will be tested on four cryptic species (Pm I, Pm II, Pm III and Pm IV) in different experiments. Studying the interactions between different cryptic species is realised by creating populations where several cryptic species are present. To analyse these populations, genetic methods are necessary.

This assignment will consist almost exclusively of molecular work (preparation for DNA extraction, DNA extractions and qPCR analysis) in which analyses are performed to discriminate the different cryptic species.

Additional Contact details:

Marine Biology Research Group, Ghent University
Krijgslaan 281/S8
9000 Ghent
Belgium

THE ROLE OF INFAUNAL AND EPIBENTHIC SCAVENGERS IN THE DECOMPOSITION OF FISHERIES' DISCARDS

Internship institute: Ghent University, Marine Biology Research Group

Supervisor: Dr. Jochen Depestele (jochen.depestele@ilvo.vlaanderen.be;

Other contact details: ulrike.braeckman@ugent.be

Number of students for this internship: 1

Description of the internship: Beam trawl fisheries, as all bottom-contacting trawls, induce mortality on benthic communities and thereby generate carrion. The induced mortalities and the increased food availability create a shift to benthic communities consisting of species with fast turnover rates and the ability to scavenge on a broad spectrum of prey, i.e. opportunistic generalists. Gear developments and the introduction of new legislation, such as the Landing Obligation, may lead to subtle reductions in mortalities and changes in the food availability from trawling. The role of returning unwanted catches to the sea, known as discarding, is under-investigated when it comes to its availability of discards as a food source to marine scavengers in the sea. The main reason is the difficulty to investigate the fate of a discarded item once it has sunken under the water surface.

Experimental manipulations that investigate the contribution of a discarded item to the diet of marine scavengers require designs that are logistically complex to realise at sea. Detailed information on the consumption of the discards is difficult to obtain from at-sea experiments, e.g. the scavenging community cannot be controlled for. Laboratory tests may complement the information from field trials with high-resolution data from replicated experiments. The student will learn in this internship how laboratory experiments are designed and set-up to complement field trial data. The student will take samples at sea to build a mesocosm experiment in the lab. The investigation of the effect of discards on the feeding behaviour of scavengers requires that both 'dead' discards and 'living' scavengers can be accommodated in the laboratory accommodation. Standardisation and control for experimental manipulations should be carefully designed in order to have a clear treatment effect. How long does it take for epibenthic scavengers to be hungry and start feeding on the offered discards? How long does feeding last? How many fish or which sizes of fish can be accommodated in the tanks without massive oxygen loss in the system? How does the species composition of the extracted samples from the sea trial and the decomposition of the discards in the lab alter the conditions of the sea water and hence of the viability of the experimental accommodation? Is there mortality of the accommodated infaunal community? How much feed should be added? Can we use a camera system to monitor the scavenging behaviour or can we visually monitor this behaviour depending on the feeding time of the accommodated scavengers? Do they scavenge gradually during the day or are the selected scavengers (starfish, edible crab...) greedy and fill their stomachs at once?

The internship will investigate how the existing experimental set-up can be modified to address the questions related the investigations of scavenging behaviour on dead discards, based upon experiences of research at Ghent University and the Institute for Agricultural of Fisheries Research (ILVO).

Institute where the work will be performed:

ILVO-Fisheries,
Ankerstraat 1
8400 Oostende
Belgium

MARINE MICROBIOLOGY

Internship institute: Max Planck-Institute for Marine Microbiology (P19)

Supervisor: Prof. Dr. Jens Harder (jharder@mpi-bremen.de)

Number of students for this internship: 2

Description of the internship: The work will focus on the cultivation of marine microbes, the experimental exploitation of their physiological capacities and some aspects of their taxonomy.

Additional Contact details:

Max Planck-Institute for Marine Microbiology
Celsiusstr. 1
D-28359 Bremen
Germany

INDUCIBLE RESPONSE TO HERBIVORY ATTACK IN SEAGRASSES

Internship institute: Centro de Ciências do Mar do Algarve (Portugal)- P9

Supervisor: Dr. Begoña Martínez-Crego (bmcrego@ualg.pt)

Number of students for this internship: 2

Description of the internship: Herbivory is a key factor shaping community structure and function by control of plant biomass and productivity. Plants may continuously reduce their quality as food, to lessen herbivory impact. Besides constitutive defence (permanently expressed), herbivore-deterrent compounds are synthesised on-demand following herbivore attack (i.e. induced defences). Chemical signals released by plants during an herbivore attack provide a rich source of information that other plants may use to mediate their production of induced defences, thus reducing their risk of grazing. In terrestrial systems, the induction of anti-herbivore defences in response to feeding is well known, but no information is available about the mechanisms of such induction in vascular marine plants (i.e. seagrasses). Seagrass meadows provide important ecosystem services, which is why a comprehensive understanding on their ecology is required for tailored conservation efforts of these valuable systems.

Internship students will be involved in a project aimed at exploring different mechanisms by which anti-herbivory defences can be induced in the seagrasses. To this aim, induction experiments will be conducted in the Ramalhete field station (CCMAR, Faro, Portugal) in April- June 2016.

APPLICATION OF LIFE IMAGING TECHNIQUES IN MARINE ANIMAL ECOPHYSIOLOGY

Internship institute: Alfred Wegener Institute, Helmholtz Center for Polar and Marine Research, Bremerhaven, Germany

Supervisor: Dr. Doris Abele (doris.abele@awi.de)

Number of students for this internship: 2

Description of the internship: Life imaging is employed to visualize cellular substructures (including nuclei, mitochondria, lysosomes) in animal cells and to analyze the response to environmental change by monitoring physiological parameters. These can range from cellular pH and ionic concentrations to mitochondrial membrane potential and the formation of reactive oxygen/nitrogen species in living cells and tissues.

We will use transparent tissues, such as bivalve gills and mantle, or meiofauna animals that we can expose to environmental change (thermal stress, hypoxia, exposure to toxic algae a. o.) and monitor the resulting stress response. Experiments will mainly be using fluorescence and confocal microscopy for life imaging, but accompanying physiological measurements can be included.

Students can be involved in different active projects in the group, but you are also very welcome you to develop and test your own ideas in analyzing environmental hazards using these techniques.

Students will be introduced to :

- marine animal models applicable for life imaging
- a variety of fluorescent dyes for analyzing physiological change
- handling of live tissues and animals in confocal and multiphoton microscopy
- image analysis and presentation of results

ORIGIN OF NOVELTY IN GENOMES OF PHYTOPLANKTONIC EUKARYOTES

Internship institute: Observatoire Oceanologique de Banyuls sur mer Laboratoire Arago 66650 Banyuls sur mer, France

Supervisor: Gwenael Piganeau (gwenael.piganeau@obs-banyuls.fr)

Number of students for this internship: 3

Description of the internship: Marine picophytoplankton comprise the smallest free-living photosynthetic eukaryotes, with a simple cell organization (one single mitochondrion and one single chloroplast), contained within a cell of 1 μm diameter. These microalgae are at the base of the food chain in coastal areas and the analysis of their genome sequences disclosed a huge genetic diversity and ancient divergence. Within the *Ostreococcus* genus, at least 4 species have been identified, with a genetic divergence greater than that observed in Mammals. Strikingly, each newly sequenced genome contains several hundreds species-specific genes, likely involved in the ecological niche differences of these species. Here, we propose to investigate the mechanisms that generate these species-specific genes. Several different mechanisms can lead to new genes; gene duplication and divergence, emergence from non-coding sequences, or horizontal gene transfer.

We will take advantage of the genomic data available within the *Ostreococcus* species complex, the Chlorophyta phylum, and the metagenomic data available from the pan-oceanic TARA-Oceans survey, to quantify the relative importance of different mechanisms on the origin of novelty in these enigmatic microalgae.

Additional Contact details:

UMR7232 CNRS-UPMC Laboratoire Arago
avenue de Fontaulé
66650 Banyuls sur mer
France

QUANTIFYING BENTHOS EVOLUTIONARY ADAPTATION CAPACITY TO OCEAN WARMING AND ACIDIFICATION

Internship institute: Ghent University, Marine Biology Research Group

Supervisor: Dr. Carl Van Colen (carl.vancolen@ugent.be)

Number of students for this internship: 1

Description of the internship: The enhanced emission of greenhouse gases (e.g. CO₂) have raised global sea surface temperatures (SST) at approximately 0.13 °C per decade since the current period of climate warming began in the mid 1980s, and climate models suggest that patterns of mean and extreme SST will alter across the globe. In addition, ocean CO₂ absorption alters sea water carbonate chemistry and pH, with temperate shallow marine ecosystems currently experiencing an order of magnitude faster decrease in pH (i.e. ocean acidification) as compared to global estimates. This unprecedented fast rate of acidification likely has consequences for the stability of marine soft-sedimentary systems since several ecosystem processes and resident species of different taxonomic and functional groups have been shown vulnerable to scenarios of ocean acidification as projected by climate change models to occur in the next century. Consequently, the investigation of the combined effects of concurrent ocean warming and acidification on the physiology, condition and survival have been put forth to improve our understanding of the mechanisms that underpin resilience of coastal soft-sediment ecosystems to climate change. In addition to the examination of such stressor effects on the performance of organisms, the likelihood to adapt to these stressors should be assessed. For example, phenotypic plasticity may facilitate the persistence of populations at the short term, i.e. the rate at which environmental changes currently take place, while evolutionary genetic adaptation will likely be required to persist at the long-term.

During this internship you will experimentally investigate the potential for habitat-dependent evolutionary adaptation of different shellfish species by quantifying phenotypic variability and response to combined effects of ocean acidification and warming. Therefore adults will be induced to spawn under control conditions and genetic variation in tolerance of embryonic growth and development to ocean warming and acidification will be quantified in a full-factorial breeding design including multiple seawater temperature and pH levels. Furthermore, separate experiments will be conducted with embryos originating from populations that vary in their exposure to temperature variability and variability in seawater pH. This approach enables accounting for the potential of context-dependency in tolerance resulting from location-specific physiological acclimatization, and will hence aid extrapolation of the obtained results. It is hypothesized that populations that experience a higher variability in stressors may show higher phenotypic plasticity and thus higher adaptive capacity to ocean warming and/or acidification.

Additional Contact details:

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CHANGE IN NORTH SEA BENTHIC COMMUNITIES: RECONCILING THE ROLE OF BROAD-SCALE CLIMATE PHENOMENA VERSUS LOCAL DRIVERS

Internship institute: Ghent University, Marine Biology Research Group

Supervisor: Dr. Carl Van Colen (carl.vancolen@ugent.be)

Number of students for this internship: 2

Description of the internship: Regime shifts are rapid reorganizations of ecosystems from one relatively stable state to another. Because the system state after the regime shift can be functionally different from that before the shift the occurrence of such shifts has considerable implications for the management of the marine environment and the provision of ecosystem services, particularly fisheries. Regime shifts can have a number of causes. Probably the best well studied are those caused by climatic oscillations which often occur on (very) large scales. Additionally, ecosystem state shifts can also occur on much smaller scales e.g. as the result of eutrophication, change in resource availability, overfishing or the introduction of alien species. Regime shifts driven by climate change and anthropogenic disturbances have been reported from many geographical areas for diverse groups of marine organisms such as fish, phyto- and zooplankton. However, our knowledge of whether such regime shifts also occur in marine benthic soft-sediment ecosystem is far less detailed. Through analysis of historic time series from different locations this internship research will identify whether the variability of benthic communities in the Belgian part of the North Sea is related to climatic oscillations and/or historic and ongoing anthropogenic activities (e.g. fisheries, sand extraction and dumping of dredge materials). Such knowledge would provide a more solid understanding of the drivers of change in benthic communities in the North Sea, thereby assisting in the management of coastal ecosystems in the current era of anthropogenically-induced change.

Additional Contact details:

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Belgium

BIODIVERSITY-ECOSYSTEM FUNCTION RELATIONSHIPS IN A CHANGING ESTUARY

Internship institute: Ghent University, Marine Biology Research Group

Supervisor: Dr. Carl Van Colen (carl.vancolen@ugent.be)

Number of students for this internship: 2

Description of the internship: Estuaries and shallow coastal habitats are among the most productive marine ecosystems. In addition to nutrient supply from land run-off and from the atmosphere, the internal recycling of nutrients within these systems substantially contributes to their nutrient load that support primary production which, together with imported organic matter, is at the basis of the pelagic and benthic foodwebs. This recycling largely results from remineralization of organic matter in sediments and from the subsequent release of (part of these) nutrients to the water column (i.e. benthic-pelagic coupling). A high benthic faunal biomass is a prominent feature of many healthy estuaries. It forms an important food source for many birds, fish and mammals. Larger sediment animals (macrobenthos) also play important roles in benthic-pelagic coupling. Suspension feeders capture suspended organic matter from the water column and incorporate part of it in the sediment, i.e. biodeposition. In addition, many macrobenthic species mediate benthic-pelagic coupling through bio-irrigation and bioturbation activities.

During this internship you will identify the infaunal invertebrate species and describe their distribution patterns along the salinity, depth and sedimentary gradients in the Schelde estuary and relate this distribution to the ecology (ecological interactions, physical habitat preferences) and functional traits of the considered species. Furthermore, you will explore the functional importance of these organisms for biogeochemical cycling by quantifying the faunal contribution to the exchange of nutrients and oxygen between the sediment and the water column. Consequently, the research conducted during this internship will gain insight into the relationships between, and the expected responses of, biodiversity and ecosystem functioning to changes in the geomorphology, sediment dynamics and salinity in the Schelde estuary.

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TRAINING ON MULTIESPECIES ECOTOXICOLOGICAL ANALYSIS

Internship institute: Centre of Marine Sciences, University of Algarve

Supervisor: PhD. Ignacio Fernandez (nacfm@hotmail.com; ivmonzon@ualg.pt)

Number of students for this internship: 1

Description of the internship: The intern will be integrated on current experiments designed to evaluate toxicological effects of different drugs on the early development of aquatic species from several taxonomic groups.

Those experiments will be part of the Master Thesis of an EMBC+ master student of this year. Therefore, intern will get hands on maintenance and rearing aquatic organisms, different techniques already applied in the Lab, in addition of having a close contact with what could be about a Master Thesis research work for the next year.

Additional Contact details:

Centre of Marine Sciences,
University of Algarve,
Campus de Gambelas,
Building 7, Office 2.76
Faro
Portugal

The Centre for Marine Sciences (CCMAR) is an independent multidisciplinary, non-profit research organization within the University of Algarve, aiming at promoting research and education within a range of different areas relevant for the institution/ region. CCMAR was classified EXCELLENT in the 2014 research assessment of the FCT, with competence in a range of areas of marine biology and ecology, biotechnology, biomedicine, fisheries and aquaculture. CCMAR has an annual budget of 3.5 million euro and hosts 100 scientists, 40 PhD students and 100 young scientists and technicians. CCMAR publishes 150-200 articles annually and in the last 5 years had 15 patents approved and established 2 spin-off companies.

CCMAR has good infrastructures and equipment to carry out research and advanced training. Core facilities, available for internal and external services, providing; i) molecular and cell biology, animal facilities for diverse species, analytical chemistry, ecology, imaging, ii) marine station with tanks to keep live organisms and large outdoor mesocosms, iii) administrative and project management services, vi) a computing and bioinformatics platform (<http://gyra.ualg.pt>) and vi) a communication, outreach and events (workshops and conferences) office.

CCMAR is part of national nodes for ESFRI infrastructures: leads EMBRC.PT (www.embrc.eu), part of Biodata.PT the national node of ELIXIR (www.elixir-europe.org) and of the national node of EMSO (www.emso-eu.org/).

EFFECT OF HEAVY METALS ON BEHAVIOURAL RESPONSES OF BROWN SHRIMP, CRANGON CRANGON

Internship institute: University of Salford, UK

Supervisor: Dr. Chiara Benvenuto (c.benvenuto@salford.ac.uk)

Number of students for this internship: 2

Description of the internship: The brown shrimp, *Crangon crangon* is a crustacean commonly found along the European coasts, which uses estuarine areas (potentially highly impacted by human pollution) as nursery ground. Pollutants such as heavy metals (Lead, Cadmium, Mercury and Arsenic) might affect the development, behaviour and pathway of sexual differentiation in the brown shrimp.

In order to assess the accumulation of these pollutants and the resulting behavioural responses (including colour change or activity pattern) under naturally contaminated environmental conditions, in this study the student will collect the shrimps from a historically contaminated area in the Upper Mersey River and then maintain them in the laboratory before performing behavioural studies. Heavy metals in the shrimp tissue will be measured using inductively coupled plasma optical emission spectroscopy (ICP-OES) to estimate the level of contamination.

MONITORING THE MESOPHOTIC: ASSESSING THE ROLE OF DEEP CORAL REEFS IN FISHERIES PROVISION IN THE CENTRE OF REEF FISH BIODIVERSITY

Internship institute: University of Oxford, UK

Supervisor: Dominic Andradi-Brown (dominic.andradi-brown@zoo.ox.ac.uk)

Number of students for this internship: 4

Description of the internship: Mesophotic reefs (coral reefs between 30m-150m depth) are poorly studied, yet they contain a rich mix of shallow and deep water species. Due to their depth, mesophotic reefs are likely to act as fish refuges from fishing impacts affecting adjacent shallow coral reefs. This project build on work started by previous EMBC+ internship students to investigate fish species distributions, abundances and biomass on shallow and mesophotic reefs in the Bird's Head Seascape, West Papua, Indonesia.

The Bird's Head Seascape contains highly diverse reefs, including the greatest coral reef fish species richness of any known location globally. Due to high fishing pressure on the reefs several new large marine protected areas (MPAs) have recently been established in the Seascape. As part of monitoring efforts when the MPAs were established, Conservation International Indonesia and partners extensively surveyed fish populations using baited camera drops (BRUVs) on shallow and mesophotic reefs, both within and outside the no take zones.

Interns will be based at the Ocean Research and Conservation Group, University of Oxford, UK, analysing this unique camera drop data set. The focus is to answer questions about i) reef fish biomass and community changes down depth gradients in the centre of global reef fish diversity, ii) differences in mesophotic fish communities within and outside the MPAs and iii) to provide a mesophotic fish reference point for future MPA monitoring.

Training will be provided in reef fish identification (though previous experience is desirable), using Event Measure video analysis software and the R statistical programming language. This project will be guided by Prof. Alex Rogers with day-to-day supervision by Dominic Andradi-Brown in Oxford's Ocean Research and Conservation Group, and is part of a collaboration with WWF and Conservation International Indonesia investigating and monitoring mesophotic reefs in the Bird's Head Seascape, Indonesia.

More information about the work of the Ocean Research and Conservation Group can be found on our website: www.zoo.ox.ac.uk/group/oceans. More details on the ecology of the Bird's Head Seascape is available in this paper: Mangubhai et al. (2012) Papuan Bird's Head Seascape: Emerging threats and challenges in the global center of marine biodiversity, Marine Pollution Bulletin 64:2279-229"

Additional Contact details:

Ocean Research and Conservation Group,
Department of Zoology,
University of Oxford
South Parks Road,
Oxford
OX1 3PS
United Kingdom

IMPACT OF OFFSHORE WIND FARMS ON THE SOFT-SEDIMENT MACROBENTHOS

Internship institute: Ghent University, Marine Biology Research Group

Supervisor: Dr. Jan Reubens (Jan.Reubens@UGent.be)

Number of students for this internship: 2

Description of the internship: By 2020 Belgium should acquire 13% of its energy from renewable resources. One option to reach this deadline has been the construction of offshore wind farms in the Belgian part of the North Sea. Three offshore wind farms are already operational in the Belgian part of the North Sea and four more concession areas are granted for construction.

A monitoring programme was set up to determine the ecological effects of this anthropogenic disruption on the soft-sediment macrobenthos (organisms living in the sediment and larger than 1mm) applying a BACI (Before After Control Impact) strategy.

In October 2015, a monitoring campaign was organised to sample the soft-sediment macrobenthos around the offshore wind farms and selected reference stations. The student involved in this topic will have the opportunity to work on these samples. First, the organisms will be identified till species level. Thereafter the samples will be analysed to investigate possible changes in the macrobenthos communities, based on biotic (biomass, density, diversity) and abiotic variables (sediment grain size, organic material).

Additional Contact details:

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ESTIMATION OF BENTHIC BIODIVERSITY IN MARINE SEDIMENTS USING METABARCODING: CLOSING THE GAPS BETWEEN CONVENTIONAL AND MOLECULAR IDENTIFICATION

Internship institute: Hellenic Centre for Marine Research - Greece - P14

Supervisor: Dr. Christos Arvanitidis (arvanitidis@hcmr.gr)

Number of students for this internship: 2

Description of the internship: Benthic macrofaunal diversity has been traditionally estimated through means of classical taxonomy, i.e. handsorting and taxonomic identification of the macrofaunal organisms according to the relevant literature. This approach, although leading to undoubtedly results especially when the taxonomic identification is conducted by an expert in the field, is time consuming and laborious.

The alternative approach is based on the use of DNA metabarcoding, combined with next-generation sequencing; this approach promises to minimize the time and effort needed to complete such a project since it allows the automated identification of multiple species from the sediment samples.

However, there is an enormous number of marine invertebrates that have not yet been sequenced; therefore, they are not included in public sequence databases. This can bias the results of a metabarcoding study because only a few of the metabarcoding derived sequences can be matched to reference barcodes in public databases.

This internship will provide insight in the genetic diversity of benthic invertebrates and it will result in the production of sequence data for various species.

This assignment involves mainly molecular work: DNA extraction from various benthic invertebrates, PCR amplification of the COI and 18S genes and Sanger sequencing.

Additional Contact details:

Hellenic Centre for Marine Research (HCMR)
Institute of Marine Biology, Biotechnology and Aquaculture (IMBBA)

Work address:
Thalassocosmos
Former U.S. Base of Gournes
71500 Gournes
Heraklion, Crete, Greece

Postal address:
P.O.Box 2214
71003 Heraklion
Crete, Greece

RECREATIONAL BOATING AS A VECTOR OF INTRODUCTION OF NON-INDIGENOUS SPECIES IN THE MEDITERRANEAN SEA

Internship institute: University of Pavia (Italy)

Supervisor: Prof. Anna Occhipinti-Ambrogi (anna.occhipinti@unipv.it)

Number of students for this internship: 1

Description of the internship: The intern will take part in a research aimed at estimating the role of recreational boating as a vector of introductions of fouling species in the Mediterranean Sea. For this purpose, the species in marinas and the species fouling on boats will be examined. Furthermore, the habits of boat owners, regarding the boat maintenance (cleaning, painting frequency) and travel history will be surveyed, in order to estimate the risk of non-indigenous species introduction.

The intern will contribute to the data collection activity in July 2016. The activity will be performed in the field in highly attended marinas in the South of Italy, together with a staff member from University of Pavia, and will consist in sampling invertebrates from the artificial structures of marinas and from boat hulls, and identify the non-indigenous species in the assemblages. Furthermore, the intern will be asked to perform interviews to boat owners, thus contributing to an awareness raising action regarding non-indigenous risk of dispersion.

MICROPLASTICS RESEARCH INTERNSHIP

Internship institute: Archipelagos, Institute of Marine Conservation, Samos Island, Greece

Supervisor: Anastasia Miliou (admissions@archipelago.gr)

Number of students for this internship: 4

Description of the internship:

Work that microplastics research interns can expect to do may be as follows:

- 1) Collection of sediment samples from beaches around the islands of Samos and Lipsi.
- 2) Collection of surface seawater samples through the use of kayaks.
- 3) Analysis of sediment, surface seawater as well as fish guts samples for the identification and quantification of contained microplastic fibers in the laboratory.
- 4) Processing and statistical analysis of the data obtained.
- 4) Writing of a scientific paper and posters to present the results of the study to audiences of varying scientific knowledge.
- 5) Collection of information and participation in related conservational activities for the development of environmental awareness in local communities.
- 6) Participation in other relevant experiments.

Additional Contact details:

Telephone: 0030 22730 61191

Mobile: 0030 6974744949

Fax: 0030 22730 37533"

The internship is open to both undergraduates and graduates of any relevant field of studies. Laboratory experience is preferred but not required. As a non-profit organisation Archipelagos cannot cover the living and working cost of the interns. Therefore interns will need to cover the monthly placement fees of 650 euros. This covers accommodation, full board, use of equipment, use of the research boats, transport for working purposes, Greek language lessons etc.

Travelling costs are NOT included in this price and are covered by the participant.

MARINE MAMMAL RESEARCH INTERNSHIP

Internship institute: Archipelagos, Institute of Marine Conservation, Samos Island, Greece

Supervisor: Anastasia Miliou (admissions@archipelago.gr)

Number of students for this internship: 4

Description of the internship:

- Boat-based surveys (weather dependent) monitoring populations of 3 dolphin species in the eastern Aegean Sea
- Photo-identification and matching techniques
- Collecting environmental and anthropogenic data
- Gathering acoustic data
- Data entry and analysis
- Raising awareness
- Utilizing ArcGIS to map populations
- Questionnaire-based surveys
- First aid of stranded animals (e.g., cetaceans, seals and sea turtles)

Additional Contact details:

Telephone: 0030 22730 61191

Mobile: 0030 6974744949

Fax: 0030 22730 37533"

Essential requirements:

- Minimum of 18 years of age or older
- Willingness to work hard and have a genuine interest in marine research
- Background in Biology, Marine Biology, Zoology, Environmental Sciences, Geosciences, Oceanography or related field
- Must be able to spend many hours on the boat. Field days might exceed eight hours and occur at least two or three times a week (weather dependent)
- Basic computer proficiency in Microsoft Office programs
- Excellent verbal and written communication skills
- Fluent in English
- Must be able to work efficiently individually and as part of a team
- Enthusiastic, responsible, diligent, detail oriented and flexible
- Prior field research experience preferred, but not required

As a non-profit organisation Archipelagos cannot cover the living and working cost of the interns. Therefore interns will need to cover the monthly placement fees of 650 euros. This covers accommodation, full board, use of equipment, use of the research boats, transport for working purposes, Greek language lessons etc. Travelling costs are NOT included in this price and are covered by the participant.

MARINE RESEARCH AND CONSERVATION INTERNSHIP

Internship institute: Archipelagos, Institute of Marine Conservation, Samos Island, Greece

Supervisor: Anastasia Miliou (admissions@archipelago.gr)

Number of students for this internship: 4

Description of the internship: The Aegean Sea supports an exceptional biodiversity, including rare and protected marine habitats and species. For over a decade, Archipelagos has collected data and monitored important ecosystems of the Aegean, assessing habitats and populations, as well as the factors impacting them. This knowledge enables the development of successful and targeted management and conservation plans. Current research and projects focus on several fields of activity:

- 1) Visual-census surveys on littoral zone ecosystems assessing fish, algae and invertebrate biodiversity, and the factors impacting them (e.g. tourism, pollution).
- 2) Mapping and ecological assessment of *Posidonia oceanica* meadows and coralligene reefs
- 3) Collection of information in related conservation activities for the development of environmental awareness campaigns within the local communities and the wider public."

Additional Contact details:

Telephone: 0030 22730 61191

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Essential requirements:

- Minimum of 18 years of age or older
- Willingness to work hard and have a genuine interest in marine research
- Background in Biology, Marine Biology, Zoology, Environmental Sciences, Geosciences, Oceanography or related field
- Must be able to spend many hours on the boat. Field days might exceed eight hours and occur at least two or three times a week (weather dependent)
- Basic computer proficiency in Microsoft Office programs
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- Fluent in English
- Must be able to work efficiently individually and as part of a team
- Enthusiastic, responsible, diligent, detail oriented and flexible
- Prior field research experience preferred, but not required

As a non-profit organisation Archipelagos cannot cover the living and working cost of the interns. Therefore interns will need to cover the monthly placement fees of 650 euros. This covers accommodation, full board, use of equipment, use of the research boats, transport for working purposes, Greek language lessons etc. Travelling costs are NOT included in this price and are covered by the participant.

DISTRIBUTION, ABUNDANCE AND BIOMASS OF DREISSENID MOLLUSCS IN THE SZCZECIN LAGOON: ZEBRA MUSSEL VS THE NON-INDIGENOUS QUAGGA MUSSEL

Internship institute: University of Szczecin, Faculty of Geosciences, Palaeoceanology Unit, Poland

Supervisor: Dr. Teresa Radziejewska (tera@univ.szczecin.pl)

Number of students for this internship: 2

Description of the internship:

The intern(s) will be expected to participate in field (collection of samples in the Lagoon) and laboratory work (sorting, identification, determination of abundance and biomass). They will have an opportunity to work in a unique setting of a coastal lagoon and participate in research targetting a newcomer to the area, the non-indigenous quagga mussel.

USING SOCIAL MEDIA TO MONITOR THE INVASIVE DISTRIBUTION OF LIONFISH (PTEROIS VOLITANS AND PTEROIS MILES) IN THE CARIBBEAN SEA AND THE GULF OF MEXICO

Internship institute: Centre of Marine Sciences. University of Algarve. Portugal

Supervisor: Ester A. Serrão, Jorge Assis, Joana Boavida (jorgemfa@gmail.com)

Number of students for this internship: 1

Description of the internship: The proliferation of lionfish (*Pterois volitans* and *Pterois miles*) in the Caribbean Sea and the Gulf of Mexico over the last ten years is threatening the balance of many tropical and sub-tropical ecosystems (e.g., coral reefs, sea grasses and mangroves). While many monitoring surveys are being implemented (e.g., by NOAA Fisheries), a cross-border approach is missing in the Caribbean Sea, which may lead to underestimating the current invasive distribution of lionfish.

The aim of this internship is to produce valuable distribution data of lionfish in the Caribbean Sea and the Gulf of Mexico using social media contents. This will be performed by analysing videos widely posted on social networks (e.g., youtube, facebook, etc.). Besides the confirmation of presence of lionfish, other valuable information (spatial and temporal) will be extracted. The student will be guided and trained to perform video analysis, database integration and spatial-temporal maps using Geographic Information Systems (GIS).

USING SOCIAL MEDIA TO MONITOR THE DISTRIBUTION OF KELP FORESTS IN IBERIAN PENINSULA AND ALBORAN SEA

Internship institute: Centre of Marine Sciences. University of Algarve. Portugal

Supervisor: Ester A. Serrão, Jorge Assis, Joana Boavida (jorgemfa@gmail.com)

Number of students for this internship: 1

Description of the internship: Global climate change is affecting the distribution of kelp forests worldwide. This is particularly evident at the low latitude rear edges, where small variations in the environmental conditions may reduce populations sizes and lead to local extinctions. The demise of kelp structuring species may have drastic negative effects in the overall biomass and diversity of the numerous associated species. Synthesizing observations of kelps forests is therefore vital to understand the main drivers shaping range dynamics and predict future responses to climate change.

The aim of this internship is to understand the ongoing losses by producing distribution data of kelp species (e.g., *Saccorhiza polyschides*, *Laminaria ochroleuca*, etc.) in the Iberian Peninsula and Alboran Sea using social media contents. This will be performed by analysing videos widely posted on social networks (e.g., youtube, facebook, etc.). Besides the confirmation of presence of kelp species, other valuable information (spatial and temporal) will be extracted. The student will be guided and trained to perform video analysis, database integration and spatial-temporal maps using Geographic Information Systems (GIS).

MAPPING THE DISTRIBUTION OF DEEP KELP FORESTS AND GORGONIAN SPECIES IN THE MEDITERRANEAN SEA AND ADJACENT SEA MOUNTS

Internship institute: Centre of Marine Sciences. University of Algarve. Portugal

Supervisor: Ester A. Serrão, Jorge Assis, Joana Boavida (jorgemfa@gmail.com)

Number of students for this internship: 1

Description of the internship: Recent climate change has produced several shifts in the distribution and abundance of numerous marine species. Such is the case for kelp forests and gorgonian species, important structuring species whose ranges have been contracting in many regions worldwide. Synthesizing long-term observations of these species is therefore vital to understand the main drivers shaping species' ranges and predict future responses to climate change.

The aim of this internship is to produce important distribution data of deep kelp and gorgonian species in the Mediterranean Sea and adjacent sea mounts using Remoted Operated Vehicles video records (provided by OCEANA). This will be performed by analysing videos and other data provided (spatial and temporal). The student will be guided and trained to perform video analysis, database integration and spatial-temporal maps using Geographic Information Systems (GIS).

COASTAL SEASCAPE ECOLOGY OF SEAGRASS MEADOWS

Internship institute: Centre of Marine Sciences (CCMAR). University of Algarve, Faro. Portugal

Supervisor: Dr. Rosa Chefa (rosa.chef@gmail.com)

Number of students for this internship: 1

Description of the internship: Coastal ecosystems represent vulnerable marine systems in which seagrasses fulfill a key role. Improving our understanding of the impacts of environmental changes on seagrass meadows is challenging. With this purpose, an increasing number of studies have been published on species distribution models (SDMs) of marine species over recent years.

Terrestrial-based landscape metrics used as predictors in SDMs have achieved favorable results. However, little progress has been made in the integration of landscape/seascape metrics in marine SDMs.

We propose an innovative approach to investigate the response to environmental and landscape changes of seagrass meadows of different species. The student will have the opportunity to integrate seascape metrics into SDMs using geographic information systems (GIS).

OCCURRENCE AND TOXICITY ASSESSMENT OF HARMFUL ALGAL SPECIES IN A SUBTROPICAL, MANGROVE-COVERED ESTUARY AND ADJACENT COASTAL ISLANDS (PARANÁ COAST, BRAZIL)

Internship institute: "Universidade Federal do Paraná (Federal University of Paraná) Centro de Estudos do Mar (Center for Marine Studies) Pontal do Paraná, PR, Brazil

Supervisor: Dr. Luiz Mafra Jr. (luiz.mafra@ufpr.br)

Number of students for this internship: 2

Description of the internship:

Students will be involved in some of the activities listed below:

- * Sampling of phytoplankton and/or benthic microalgae (covering sediments, seagrass, seaweeds, coral reefs);
- * Cell isolation and culture establishment;
- * Culture maintenance in the laboratory;
- * Lab experiments to evaluate toxin production over the growth cycle and/or the toxic effects of selected harmful algal species to marine organisms;
- * Toxin analysis by high performance liquid chromatography (HPLC) coupled to mass spectrometry (MS/MS), fluorescence (FLD) and/or diode-array (DAD) detection.

Additional details:

Internship will be hosted at the Microalgae Laboratory (Laboratório de Microalgas - LaMic), and the Liquid Chromatography Laboratory (Laboratório de Cromatografia Líquida)

Specific skill:

- * For field work with benthic algal species, SCUBA diving certificate is desirable (but not mandatory);
- * For toxin analysis, basic knowledge on HPLC is desirable.

General information:

- * The Center for Marine Studies, located right in front of Honey Island - the main touristic attraction of Parana coast, is only 110 Km far from Curitiba, the State capital;
- * There are a few bed and breakfast properties available nearby, but students usually rent/share summer houses or rooms. Fares usually range from US\$ 100.00 to 300.00 / month, depending on the housing choice;
- * Students have access to a University restaurant, where meals (breakfast, lunch and dinner) are served 7 days a week for a very affordable price (around US\$ 0.50 per meal)."

CREATION OF TRAINING PACKAGES FOR ANALYTICAL AND SAMPLING EQUIPMENT AT GHEENT UNIVERSITY IN THE FRAMEWORK THE EUROPEAN EMBRC RESEARCH INFRASTRUCTURE

Internship institute: Ghent University, Marine Biology Research Group

Supervisor: Dr. Tim Depez (tim.depez@ugent.be)

Number of students for this internship: 4

Description of the internship: Ghent University is since two years a core member of the EMBRC network (<http://www.embrc.eu/>). One of the main aims of this network is to share access to research infrastructures within the network. Use of equipment and tools however requires good documentation on the use of it. In the framework of this internship students will learn to work with equipment and develop good and clear tutorial material in the form of textual documents and video tutorials. Depending on the number of interns and the personal interest of the intern, the techniques and equipments will be set.

Additional Contact details:

Tim Depez: +32(0)9 264 85 26

PHYSIOLOGICAL RESPONSES OF EPIBENTHIC ORGANISMS TO EXTREME EVENTS OF TEMPERATURE AT ITS SOUTHERN GEOGRAPHIC LIMIT

Internship institute: Centro Interdisciplinar de Investigação Marinha e Ambiental (CIIMAR), Portugal (P24)

Supervisor: Dr. Joana Campos (jcampos@ciimar.up.pt)

Number of students for this internship: 2

Description of the internship: Changes on the mean intensity or temporal variability of climatic extreme events have been reported all over the globe. In this internship, the physiological response of epibenthic organisms to temperature extremes will be studied through a series of experimental trials under wide environmental gradients. These will include changes not only in mean intensity but also on temporal variance of physical stressors. Relevant physiological (e.g., oxygen consumption rate) and demographic responses will be studied across the physical gradients, identifying thresholds, sub-lethal and lethal conditions.

FIELD EXPERIMENTS: ENDOSYMBIOTIC BACTERIA IN CAULERPA IN THE MEDITERRANEAN SEA

Internship institute: Ghent University

Supervisor: Prof. Dr. Olivier De Clerck (odclerck@gmail.com)

Number of students for this internship: 1

Description of the internship: To address how bacteria contribute to the ecological success of siphonous green algae and whether the competitive potential of invasive species may be at least partly shaped by associated microbes, we carry out metagenomics to analyse the functional diversity of epi- and endophytic bacterial communities associated with native and invasive species of *Caulerpa*.

The student will assist in the sampling of natural populations altering the abiotic conditions of the *Caulerpa*. Sampling takes place at DEU (Turkey, Levent Cavas) and consist of temperature and nutrient manipulation experiments. Diving experience is essential.

FOOD SELECTIVITY OF MARINE NEMATODES UNDER STRESS CONDITIONS

Internship institute: Ghent University, Marine Biology Research Group

Supervisor: Anna-Maria Vafeiadou (AnnaMaria.Vafeiadou@UGent.be)

Number of students for this internship: 2

Description of the internship: Increased temperature fluctuations and maxima have been reported the last decades as main consequences of global climate change. In intertidal areas, the combination of episodically elevated water temperature and short-term exposure to high air temperature at low tide may exceed the tolerance of some organisms, causing local extinctions. Although organisms develop plasticity towards stress, extreme change of the environmental conditions can eventually alter population dynamics. Marine nematodes are the most abundant benthic organisms, and due to their short life span, they are an excellent taxon for the investigation of benthic responses to such stress conditions.

Their response can be examined at multiple levels. In this project, we will investigate the effects of temperature changes on the ecology of marine nematodes, more specifically their foraging behaviour, with in vivo microcosm experiments. Specifically, we will investigate food selectivity and focus on three closely related nematode species which differ in their tolerance to temperature fluctuations and extremes. These nematode species are available in cultures in the Marine Biology Lab. We will test the way they react when offered specific food sources (e.g. different bacterial strains or abundances) under different temperature regimes, by focusing on their motility and taxis towards food. In this way we aim to investigate: i) whether there is a differential food selectivity of these nematode species, and, more importantly, ii) whether this preference is affected by changes in temperature conditions. The practical work involves the setup of microcosm experiments, observations and video-recordings of nematode behaviour, and the concomitant analysis of video-images.

Additional Contact details:

Prof. Tom Moens

Email: Tom.Moens@UGent.be

DIVERSITY AND ECOLOGY IN PELAGIC ECOSYSTEMS: INTEREST FOR MANAGEMENT

Internship institute: Observatoire océanologique de Villefranche-sur-mer - UPMC

Supervisor: Laure Mousseau (laure.mousseau@obs-vlfr.fr)

Number of students for this internship: 12

Description of the internship: Coastal areas are greatly impacted by the human activities; a state of their ecological state needs to be done in order to insure an appropriate and healthy coastal ecosystems for a sustainable use. Biological descriptors had been identified in order to follow the ecological state of the water masses, firstly concerning the benthos, but we are now at the step to work with planktonic indicators. This internship will be done in two complementary parts : lectures about specific and functional diversities, and lab/field works about the diversity and ecology of pelagic organisms. Daily, we will work on the local boat to sample the organisms and to observe the ecosystems and its functioning. Some professionals working in the coastal management (e.g. toxic algae, marine mammals, ...) will be involved in the lectures.

Additional information:

- Dates : 2 - 20 may 2015
- Accommodation: Provided in the Observatory. The showers and toilets are upstairs. The bedding is complete. Provide towels. A launderette is available for the transfer of a token. The amount per night is 6.60 €
- Lunch available (3.40 Euros) and evening meals/dinner (3.40 Euros) at the CROUS current rate, in the restaurant of the Observatory. In addition, you have to pay for a membership card for a small fee (4,00 Euros) and to get it, you have to bring a copy of your student card.
- registration rate to UPMC = € 55.10/student
- do not forget the immigration process if needed

MANTA RAY POPULATION USING PHOTO ID

Internship institute: Zavora Marine Lab, Mozambique

Supervisor: Yara Tibirica (yara@zavoralab.com)

Number of students for this internship: maximum 6 students for all offered internships

Description of the internship:

Manta Rays are the largest rays in the world. Recently the genus *Manta*, that was historically considered monotypic, was re-described into two different species, *Manta birostris* and *Manta alfredi*. In Zavora *M. alfredi* is the most abundant, however both species can be seen all year round with the peak between June and September. Despite the abundance, little is yet known about our manta population. Manta rays have a unique spot pattern on their belly and between their gills, which make it possible to identify individuals. Photo identification uses the same principles as mark and recapture studies but because of the distinctive pattern we are able to use photos instead of tags. The advantage is that photo-identification is a non-invasive technique and you are still able to gain valuable information about these fabulous animals. The software, Manta ID (MID), was especially designed for the Lab. to easily identify individuals.

Our research aims to raise knowledge about Zavora's manta population and assist with the conservation of these massive rays. Some of our research questions are:

- What is the structure of the manta ray population?
- To what extent do manta rays in Zavora belong to the same population of manta rays in other southern Mozambique areas (e.g. Tofo and Guinjata)?
- What is the abundance of manta rays over the years and what variables might affect such abundance?
- How do the manta rays use our cleaning stations?

Additional information:

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Inharrime
Prov. de Inhambane
Mozambique

Zavora Marine Lab. is under direction of Imanja - Research and Marine Conservation
Director: Yara Tibirica
Tel +258 84846267425

Website: www.zavoralab.com, www.mozdivers.com

The Lab. is located in Zavora Beach in southern Mozambique, approximately 1.5 hours south of Inhambane town and 9 hours north of the South Africa- Mozambique border. We are a remote destination with the closest town (Inharrime) around 30km away. With the exception of mid-December to mid- January, which is the busiest tourist season, Zavora is very quiet and peaceful. It is an excellent place for people who enjoy being close to nature, and who enjoy the thrill of exploring untouched reefs.

Internship investment: 2,600USD per month or 1,850USD for 2 weeks

The price includes:

- Up to 25 dives per month including gear (12 for 2 weeks)
- Transfer from Inhambane to Zavora on the 1st of each month
- One month accommodation
- 5000Met allowance for food (2500met for 2 weeks)
- Optional six traditional meals per week
(2000Met/month- discounted from your food allowance)
- Research tutorials and assistance

NUDIBRANCH DIVERSITY AND DISTRIBUTION

Internship institute: Zavora Marine Lab, Mozambique

Supervisor: Yara Tibirica (yara@zavoralab.com)

Number of students for this internship: maximum 6 students for all offered internships

Description of the internship:

Sea slugs are one of the most diverse marine invertebrates in the world with more than 5000 species described and many that are yet to be described. The biggest group of sea slugs is the nudibranchs, well known by experienced divers due to their vibrant colors and amazing camouflage. In the Western Indian Ocean studies on nudibranchs have been very limited, giving us a unique opportunity to discover and explore new ground! We are conducting the first study on nudibranchs in Mozambique, looking at diversity, taxonomy and distribution. This project is part of Yara's PhD on marine science by the University of Cadiz. Several techniques are used to collect our data including searching per time, quadrat, analysis of substrate and small artificial reef (SAR).

So far, more than 210 species have been found in Zavora alone, 90% are new records to the country and around 30 are undescribed to science. Specimens are described externally and when necessary the internal morphology is investigated through dissection conducted in our lab. For some particular groups molecular analysis is done at The University of Cádiz.

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HUMPBACK WHALES

Internship institute: Zavora Marine Lab, Mozambique

Supervisor: Yara Tibirica (yara@zavoralab.com)

Number of students for this internship: maximum 6 students for all offered internships

Description of the internship:

Humpback whales are one of the most fascinating animals on Earth. Every year they come to Zavora to reproduce and give birth to their calves. Small and large groups of these mammals can be observed from shore easily and often heard, even occasionally seen underwater. During the whale season we conduct land based whale assessment to estimate the relative population of humpback whales using Zavora Bay, observations are conducted three times per week from 6am till dark, during which time we collect various data such as the estimated number, behavior, direction of movement and position of whales. A good day of surveying can generate over 100 humpback whale sightings, the data revealing preferential areas for humpbacks in the bay according to behavior. In 2014 we photographed the first record of a newborn whale in the region, which still had its umbilical cord.

Every Humpback whale has distinct markings on their tail fluke making it possible to identify individuals. Humpback whale photo ID is a challenge, but it is an important tool for migration studies, as it allows us to compare our data with other similar projects, and also try and recognize returning individuals. We have created the first national online humpback whale database, www.mozwhales.org allowing our research to reach even further.

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ARTIFICIAL REEF COLONIZATION

Internship institute: Zavora Marine Lab, Mozambique

Supervisor: Yara Tibirica (yara@zavoralab.com)

Number of students for this internship: maximum 6 students for all offered internships

Description of the internship:

On the 11th of March 2013, the Rio Saiñas sank in Závora Bay. The wreck is of a 250 ton fishing vessel, which drifted to shore after losing power. After evaluation the insurance company declared it a write off, so the plan was to clean the vessel and sink in international waters. After all the fuel and oils were pumped off, she was towed off the beach but due bad weather sank just 3 km from the shore. It was an excellent opportunity to start a monitoring program to evaluate colonization from zero in a wreck in the Indian Ocean.

A complete survey has been done including benthonic and fish communities. The growth of marine life has been extremely rapid. Today the wreck is home of few red listed animals such as the brindle bass (*Epinephelus lanceolatus*) and the catface grouper (*Epinephelus andersoni*).

Monitoring is done through photo quadrat of the substrate, video transect and stationary fish census.

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SEA HORSE MONITORING PROGRAM

Internship institute: Zavora Marine Lab, Mozambique

Supervisor: Yara Tibirica (yara@zavoralab.com)

Number of students for this internship: maximum 6 students for all offered internships

Description of the internship:

In January 2015, Zavora Marine Lab. has combined its efforts with the iSeaHorse Program to monitor and protect the sea horses of Barra Lagoon. Barra Lagoon is an Estuary located 100km from Zavora, in Inhambane. The sea grass bank is a habitat for a great abundance of sea horses. However there is no current information on the status of the sea horse population in the area. The iSeaHorse Monitoring Program is a standardized international program aiming to assess the sea horse population, trends and treats.

Trend data helps to identify seahorse populations that are in need of further research and conservation management, and allows policy-makers and managers to set priorities based on scientific information rather than anecdotal observations. By sharing results, as well as collaborating with and supporting local groups, we can all work to improve the fate of seahorses while engaging more people in ocean conservation.

All participants will take formal training that can be used in Mozambique or any other place around the world and receive a participation certificate from iSeaHorse.

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Internship investment: 2,600USD per month or 1,850USD for 2 weeks

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SEA TURTLE PHOTO ID

Internship institute: Zavora Marine Lab, Mozambique

Supervisor: Yara Tibirica (yara@zavoralab.com)

Number of students for this internship: maximum 6 students for all offered internships

Description of the internship:

Sea turtles, as mantas and whale sharks, have individual patterns on the face that helps to reorganize individuals. Such patterns allow research to understand population status and movements. This information is essential to robust management plans and conservation. Additionally, our sea turtle data is being currently used by a PhD candidate to better understand trends and population status of sea turtles in Mozambique. Interns will assist on data collect and learn how to use the ID software TORSOOI.

Additional Contact details:

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