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New Marine Sciences school subject to be piloted in 2019

The Two Oceans Aquarium, in partnership with Gansbaai Academy, Simon's Town High and South Peninsula High will, in January 2019, launch Marine Sciences as a new pilot subject. These three schools have been selected as "Marine Sciences Node Schools" and will offer the new subject to Grade 10 learners. These learners will be the pilot group and successful candidates will be awarded a Two Oceans Aquarium Gr12 Marine Sciences Certificate when matriculating. This pilot will guide teachers to introduce this subject as an official Matric subject for Gr 10 students in 2020.

For Russell Stevens, Head of Education at the Two Oceans Aquarium, this is a significant milestone in the work towards the development of the subject which will be implemented in schools across the country from 2020. "This "project" is gaining momentum and the process has put the Two Oceans Aquarium on the map for the most senior officials in the country. Our team have worked very hard at developing partnerships with the Department of Basic Education and



The Two Oceans Aquarium has many educational opportunities available for learners of all ages and walks of life.

in the provincial education departments (WCED; Eastern Cape; KZN and the Gauteng Education Department). All are now familiar with our programmes and the significance of our offering in the South African education landscape. Support from senior officials in the Departments of Education has shown recognition for the contribution made by the Two Oceans Aquarium staff in the partnering with South Africa's formal education sector."

The Two Oceans Aquarium has a very active and respected

education department that sees approximately 70 000 school children visit the Aquarium each year who are introduced to the wonders of the marine ecosystems. In addition, 30 000 children are exposed to the Aquarium's two outreach programmes. Additionally, since 2005 the Two Oceans Aquarium's Environmental Education Centre has offered enrichment courses for learners from Grade 6 through to Grade 12. These courses, usually presented over weekends or during school holidays and through various sponsorships, are offered free of charge for the learners. It is

from these highly-acclaimed and ever-popular courses that Aquarium's education team was approached by the department of education to develop the Marine Sciences curriculum for schools.

The Marine Sciences curriculum has been conceived to cover five sub-disciplines:

- **Marine Geography and Geology:** this section deals with the structure and origins of coastlines, the seafloor and sediments, and how these change over time.

- **Marine Chemistry:** the chemical composition and properties of seawater, and the effects of pollutants on ocean life.

- **Marine Physics:** waves, tides and currents, as well as the ways in which the ocean acts as a driver of weather and climate.

- **Marine Biology:** marine life and includes ecology, fundamental biology, classification, evolutionary processes, and the adaptation of marine organisms to their environments.

- **Humans and the Ocean:** this

section highlights how humans use the ocean for food, travel and recreation, and how renewable and non-renewable resources are harvested. This section also considers the importance of research in understanding the ocean and the effects that human activities and practices have on the ocean and larger global patterns (e.g. climate change, ocean acidification). The issue of sustainability is foregrounded in the teaching of the entire subject.

There are five specific "Marine Sciences Aims" which relate to the purposes of learning science:

- Know the subject content (theory).
- Conduct practical work and investigations.
- Understand the applications of Marine Science in everyday life, the history of Marine Science discoveries, and the relationship between indigenous knowledge and science.
- Understand the

multidisciplinary nature of Marine Sciences and be able to explain variables in more than one branch of Marine Sciences.

- Understand the sensitive nature of the ocean, the scientific evidence of human impact on marine ecosystems, and the importance of sustainable management practices.

The Marine Sciences pilot subject will be launched at the node schools in January 2019 as part of the Grade 10's curriculum. It will be offered as an "after-school" 8th subject at the node schools, over two afternoons per week (as determined by the school). The subject will also be available to interested Grade 10 learners from neighbouring schools and nearby areas. To apply, click [here](#) or more information.

Source:

Two Oceans Aquarium. (2018, November 29). New Marine Sciences school subject to be piloted in 2019. Retrieved from <https://www.aquarium.co.za/blog/entry/new-marine-sciences-school-subjecta-for-grade-10-learners-in-2019> ⌘

Cabinet approves a representative network of Marine Protected Areas in the South African Exclusive Economic Zone

The Department of Environmental Affairs announced that Cabinet approved a network of 20 Marine Protected Areas (MPAs) that are representative of South Africa's rich coastal and ocean biodiversity. This will increase the ocean protection within the South African Exclusive Economic Zone (EEZ) to 5%.

"This network of 20 MPAs, approved by Cabinet on Wednesday, 24 October 2018, will considerably advance South Africa's efforts to protect our ocean heritage for future generations. They will contribute to fisheries sustainability, advance marine ecotourism, and will help maintain resilience in ecosystems that are under stress from climate change", said the Acting Minister of Environmental Affairs, Mr Derek Hanekom.

Work on the new approved network of MPAs dates back to 2014, when the South African government endorsed a plan to achieve, as part of Operation Phakisa: Ocean

Economy, a viable network of MPAs.

"South Africa's ocean space, which is one of the most varied in the world, is highly productive with rich biodiversity providing living and non-living resources that contribute significantly to the country's economy and to job creation. As we grow and intensify the ocean economy, it is essential to provide the necessary protection to a representative sample of marine ecosystems, thereby ensuring their resilience to human use and impact, and to the impacts associated with climate change", said Minister Hanekom.

MPAs provide safe spaces in which fish can breed undisturbed. They are essential to maintain eco-certification of the South African deep-sea trawl fishery. This certification process assesses whether habitat and nursery areas for the hake fishery, are adequately protected. MPAs also contribute to

growing South Africa's marine ecotourism sector by providing undisturbed natural habitat for whales, sharks, seals, dolphins, turtles and seabirds for international and domestic tourists to experience.

An adequate network of MPAs will also provide the basis for ongoing resilience to the impact of climate change. Oceans are an essential component of the climate system, absorbing and transferring heat, and regulating the exchange of carbon dioxide (CO₂) with the atmosphere. With increasing CO₂ levels, and rising ocean temperatures, this regulatory capacity is at risk. The network of MPAs will assist in building ecological resilience, and therefore social and economic resilience in the growing ocean economy.

The new MPA network is the product of extensive consultation and negotiation with all stakeholders, which sought to ensure that the network is aligned with relevant

policies and priorities for fisheries, aquaculture, tourism, as well as marine mining and oil exploration, while also protecting ecologically important areas.

South Africa is also mindful of its longer term commitments to the protection of marine biodiversity, including meeting the 2020 Global Target in the Decadal Plan of the Convention of Biodiversity (CBD), which stands at 10%.

“The efforts to increase the protection of marine ecosystems is within this global and national context. MPAs are important in maintaining ecosystem functioning and structure as well as protecting biological diversity. The approved 20 new MPAs are a significant step towards meeting the global 2020 target.” said Minister Hanekom.

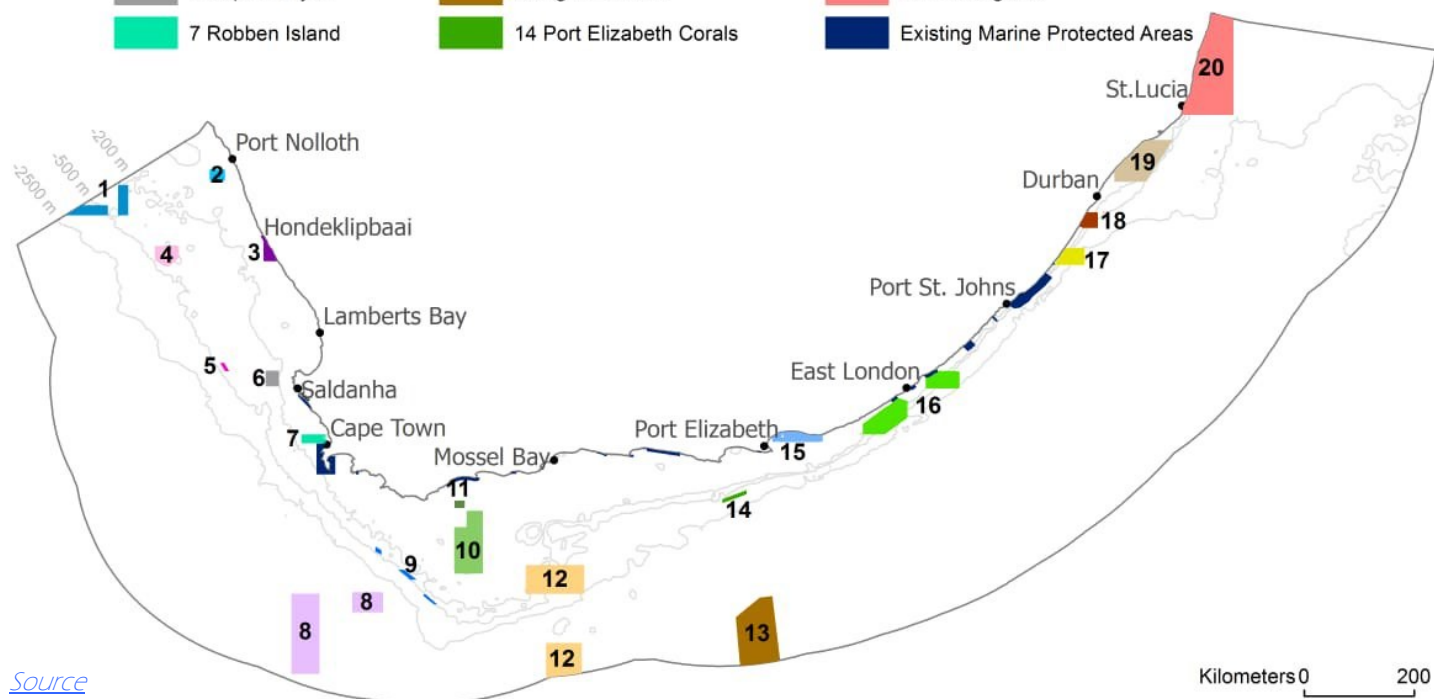
Source:

Department of Environmental Affairs. (2018, October 25). Cabinet approves a representative network of Marine Protected Areas in the South African exclusive zone. Retrieved from https://www.environment.gov.za/mediarelease/cabinetapproves_representativenetworkofMPAs

South Africa's New Marine Protected Area Network

25 October 2018

- | | | |
|---|--|---|
|  1 Orange Shelf Edge |  8 Southeast Atlantic Seamounts |  15 Addo Elephant National Park |
|  2 Namaqua Fossil Forest |  9 Brown Bank Corals |  16 Amathole Offshore |
|  3 Namaqua National Park |  10 Agulhas Bank Complex |  17 Protea Banks |
|  4 Childs Bank |  11 Agulhas Muds |  18 Aliwal Shoal |
|  5 Benguela Muds |  12 Southwest Indian Seamounts |  19 uThukela |
|  6 Cape Canyon |  13 Agulhas Front |  20 iSimangaliso |
|  7 Robben Island |  14 Port Elizabeth Corals |  Existing Marine Protected Areas |



Source

The new EAF Nansen Programme

By

Mark J Gibbons

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University of the
Western Cape*

The year 2017 was a landmark one for the development of African marine science, following the launch of the new *Dr Fridtjof Nansen* (Plate 1; Box 1). This research vessel is the third to carry the name of the pioneering Norwegian marine scientist and humanitarian, and she is one of the most advanced research ships currently sailing the world's oceans. The Institute for Marine Research (IMR) in Bergen, Norway, operate and staff her; the Food and Agricultural Organisation (FAO) of the United Nations manage and direct her activities, and NORAD (Norwegian Agency for Development Cooperation) funds and actually owns her. Since 1975, FAO and partners have supported developing countries in fisheries research and management in their efforts to enhance food security and alleviate poverty. More recently, the goal of the Nansen project, because that's



Plate 1: Three vessels have borne the name *Dr Fridtjof Nansen*. The first (right) operated between 1974 – 1993; the second (left) was active between 1994 – 2016, and the most recent (centre), was launched in 2017. Painting by Yves Berube, with permission IMR.

Box 1 The new *Dr Fridtjof Nansen*

The new *Dr Fridtjof Nansen* (Plate 1) is 74.5 m long, almost 17 m wide and weighs just shy of 4 000 t gross: she has a top-speed of about 14.5 knots and is fitted with a passive anti-rolling tank system, which, when it eventually works, will be a boon for the seasick. She can carry up to 30 scientists and is equipped with both wet and dry plankton/benthos laboratories; large wet and dry fish laboratories as well as a dedicated laboratory for the analysis of seawater samples. There is a 27m² CTD hangar and a 53m² main scientific hangar, the latter from which an ROV (Remotely Operated Vehicle) can be launched, grab and (biological and geological) core samples can be taken and various plankton nets deployed. She boasts a well-supplied library, a fully equipped weather station, and an enormous operations centre with data acquisition systems and a scientific computer system network. There is little that she cannot do, and as befitting a vessel that can collect all types of samples, she has a number of electric driven fishery winches with a capacity to trawl 40 t each, one outhaul winch at the cod end with a capacity of 3 t, one pelagic net drum of 40 t capacity, one combined Gilson and wire winch of 11 t, and a multi-purpose deep sea instruments winch that can be used for benthic sledges. If there is one thing that the Norwegians can do very well, it is to find fish. The new *Dr Fridtjof Nansen* has scientific split-beam echo sounders, two acoustic doppler current profilers (ADCP) of 75Hz and 150Hz, an ocean surveyor, one omni-directional (intermediate range) fisheries sonar and two bathymetric multi-beam echo sounders, one for intermediate range (2,000m) and one for deep water (5,000m).

what it effectively is – a project, has focused on the implementation of the ecosystem approach to fisheries (EAF), and resource and environmental surveys have been integral to achieving its aims. The programme has developed into a unique mechanism for cooperation, knowledge generation and exchange of technology and lessons learned, particularly in Africa.

The EAF-Nansen Programme is designed around three pillars: strengthening the knowledge base for the sustainable management of fisheries, supporting improved fisheries policy and management in line with EAF, and developing capacity at the institutional and human resources levels. With the launch of the new research vessel, the EAF-Nansen Programme has been revamped, in part, to emphasise science, and the science plan for the next five-years (2017-2023) focuses on strengthening the first of these pillars in the face of increasing fishing pressure, climate variability/change, pollution and other anthropogenic stressors. It is the product of many, many consultations held with partners over a two-year period, and although living marine resources remain the

core area of interest, these are embedded within an understanding of the main drivers of change in marine ecosystems (Figure 1).

I was invited to the science programme

meeting in Rome, at the FAO headquarters, in January 2017, at which colleagues from African maritime states, regional Large Marine

Ecosystem (LME) programmes, FAO and IMR unpacked and fleshed-out the high-level science plan and discussed the nitty-gritty details: the key questions and the approaches to use in order to answer them. We discussed everything from potential collaborations, cruise plans and sampling protocols; data and metadata formats and information integration, etc., etc. The practical end-result is a comprehensive, effectively synoptic, cruise plan

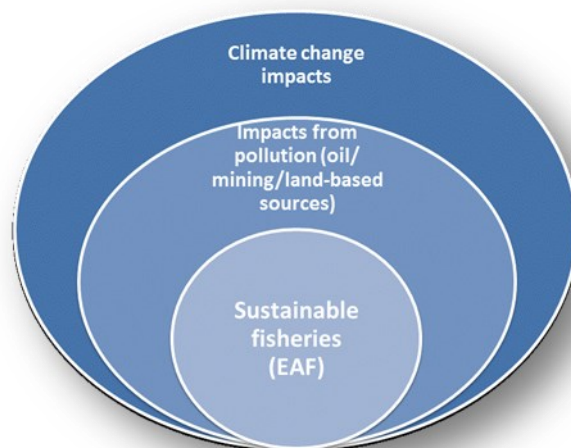


Figure 1: Conceptual framework for the content of the new EAF-Nansen Programme. The three focal areas are

- fishery resources, associated/impacted species and fisheries, including mapping the distribution of and assessing the abundance, structure and dynamics of main fishery resources, including understanding of key biological parameters and the impacts of fisheries;
- understanding the impacts of oil/gas activities, land-based pollution, including marine debris and microplastics;
- understanding the impacts of climate change on fish stocks and ecosystems, including the establishment of monitoring systems.

around Africa for the period 2017-2019 (Map 1). Whilst the West African focus in 2017 is now over, and 2018 will see research extending along the east coast and the Mascarene Plateau, there will be a return to the west again in 2019 – albeit with a demersal rather than pelagic flavour. Prior to each leg of the cruise, regional meetings have been held with the maritime states involved with that leg of the campaign, at which potential collaborations are converted to real

collaborations, and local science needs added to the higher level science requirements of the programme. Aside from my contribution, by way of adding detail, to the science plan, UWC is directly involved in a number of projects: Themes 1, 3, 4 and 7 (Figure 2), and we have participated in many legs of the cruise...when international visas have been granted in time! A word of advice: if you want to travel within Africa for work or transit purposes, please be aware that it can take a frustratingly long time to secure travel permits

and you need to plan accordingly. Deep pockets help!

The stories that the UWC students have each brought back from our time at sea on the new Dr Fridtjof Nansen during 2017 were very similar. She is a wonderful platform for research and she provides a marvellous laboratory for sharing experiences and adventures across nations. Whilst the personnel in each six-hour shift were generally selected on the basis of a shared language (French, Portuguese or English), interactions between

shifts were not curtailed. And neither were they hampered by individual interests because people that were plankton team members one moment were fish team members the next. The different IMR crews were all fantastic – nothing was ever an issue and they never complained, not even when they had to fix broken trawl nets. They were helpful, encouraging and enthusiastic, being just as keen to see what was caught in the nets as we were. And boy did some of us catch “cool stuff”! Two of the legs (1.2 and 3.3) were focussed on

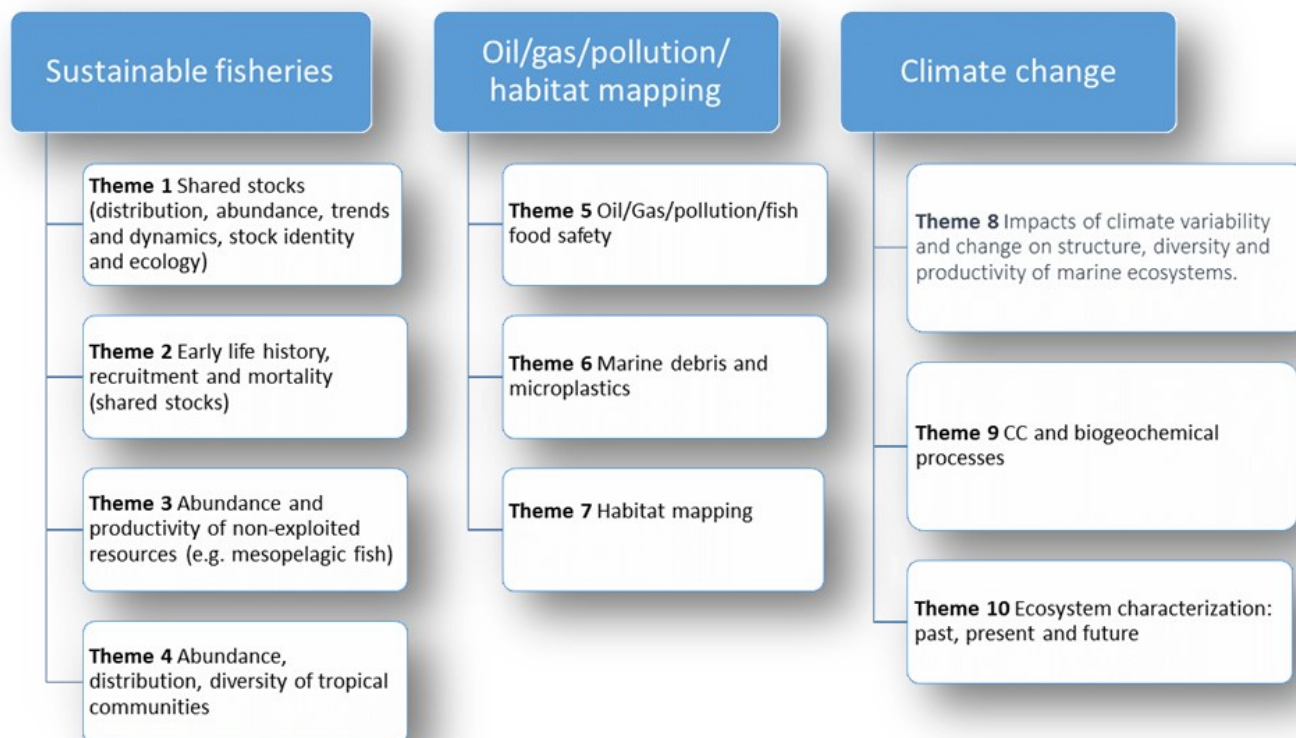


Figure 2: Research topics and themes

mesopelagic organisms that live at depths between 200 m and 1 000 m, and at the deeper stations offshore (> 3 000 m water depth) we were catching beasts that you only get to see in text-books. Fish with ginormous jaws and terrorising teeth, with fishing lures and spotlights (Plate 2); with names like snaggletooths and bristlemouths. Deep-sea angler fish that have the consistency of wet paper bags and for whom the males are parasites of females, octopods that live in mucous sacs and hundreds of red shrimps and copepods! Truly amazing and a privilege to witness. Off the coasts of Morocco and Senegal we caught sardines and shad, off the coast of Liberia we collected sardines, shad and bonga, and off Namibia we caught no sardines but jellyfish – lots and lots of jellyfish: in one trawl (Plate 3) we netted 7 t of red jellies (*Chrysaora fulgida*) and one snoek! There was always something around the vessel during the day (flying fish, dolphins, larger whales, albatrosses, gannets and tropic birds), and at night the stars were better than can be seen from Sutherland.

Whilst the vessel was dry for most of the time, braais were held on some

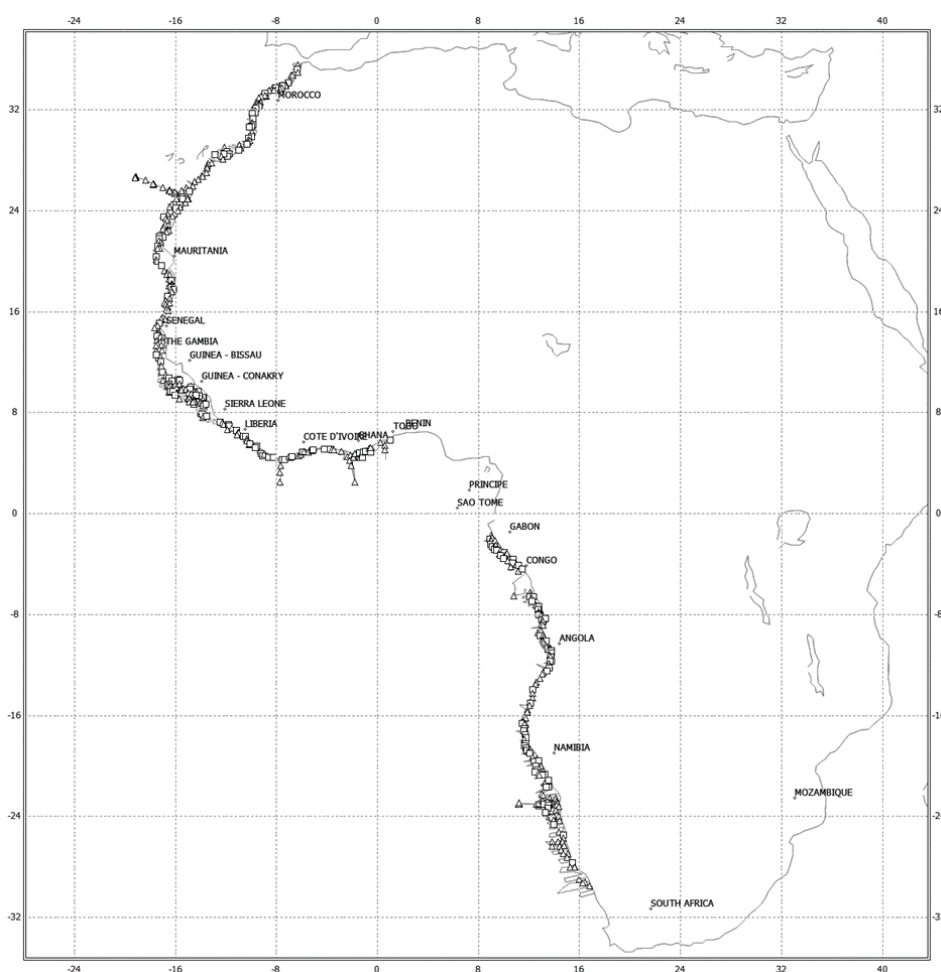
of the legs and the hospitality was First Class. Smoked salmon, poached salmon and salmon roulade were routinely available in the fridge, if not served at lunch or supper, as were crab claws, potted shrimps and smoked mackerel. The Vikings like their fish, and though we didn't eat much hake, we did consume cod in quantities, and on occasion also whale and shark meat. Norwegians also like their pork, which made halaal eating complicated. The cabins were spacious, though the bunks were cramped and my only gripe is that scientists over the age of 50 should not be allowed to sleep on the top one. Older people often have to use the lavatory more than once in the middle of the night, and I fell out of mine on one occasion whilst trying to manoeuvre my body into a position that would enable me to navigate the ladder without standing in the face of my berth companion! Each cabin has a TV, there is a big lounge with an almost cinema-size screen and a gym. The sun deck was used by our pale Nordic hosts at almost every opportunity; melanomas be damned. And, importantly for people from the Cape, there was a chance to have a shower every

Box 2: Principles used for the selection of research projects

- 1) Sustainable fisheries management is at the heart of the Programme and improving knowledge on distribution, abundance and structure of main stocks and the effects of fisheries on them will be given priority, particularly as regards main transboundary resources. The research should however expand to improving understanding of key biological parameters, the role of fishery resources in the broader ecosystem context, how they are affected by fishing pressure as well as by climate variability and change and the impacts of fisheries and other stressors on resources and the environment.
- 2) Research should primarily address regional issues (e.g. shared fishery resources/stocks), but could be "localized" in nature (e.g. study of recruitment processes for any important regional stock).
- 3) The EAF-Nansen Programme will operate primarily within countries Exclusive Economic Zones (EEZs) but work in Areas Beyond National Jurisdiction (ABNJ) can also be included in collaboration with Regional Fisheries Management Organisations (RFMOs)
- 4) To the extent possible, research activities should take cognizance of and coordinate with national, regional and international fisheries and marine research Programmes
- 5) Research should be linked to management needs, either tactical (short-term) (e.g. necessary for fisheries management, assessment or monitoring of oil and gas impacts, or for overall or environmental management), or strategic (long-term), contributing to "global public goods", i.e. research that can be important from a strategic view point but does not necessarily directly address immediate needs.

day: not a 90-second, tap on, tap off, soap, tap on and rinse, tap off affair but a proper, 10-minute long shower during which you could brush your teeth, whistle a tune, and relax after a shift on deck. And then you could have another after your session at the gym. And another to wake up to...

It's too early to report on the results of the different projects that were undertaken on the vessel during 2017. Especially as in some cases the data collected are incomplete, requiring the full three-years' of sampling to answer the questions posed. However, I do think it is fair to say that the results of the work should prove novel and ground-breaking in some instances, and important for the EAF in all cases. But perhaps more importantly, there is the real opportunity for active collaboration between African maritime states. After all, I cannot think of the last time that a



Map 1: Survey grid covered by the Dr Fridtjof Nansen around the west coast of Africa during 2017. Note: the inner shelf of the Gulf of Guinea was not surveyed for security reasons.

coordinated three-year long opportunities presented by the EAF programme of scientific research Nansen Programme around Africa, a has been conducted around Africa! number of ancillary activities have been proposed, and funded, by the In order to capitalise on the research councils of Norway and



Plate 2: Photographs of different text-book species of mesopelagic fishes caught during Leg 1.1 of the 2017 cruise of the Dr Fridtjof Nansen off NW Africa. Hatchet fish *Argyropelecus aculeatus* (above left), bristlemouth *Sigmops elongates* (above centre), snaggletooth *Astronesthes* sp. (above right). All photos by Lisa Zeigler (UWC).



Plate 3: An estimated seven tons of jellyfish (*Chrysaora fulgida*) were caught in a single trawl during Leg 3.3 of the 2017 cruise of the *Dr Fridtjof Nansen* off Namibia. Photo by Mark J Gibbons.

South Africa. These are centred around capacity development and will include workshops and extended study visits. Workshops will draw in international and regional expertise and will be convened in relevant

and appropriate locations in order to support aligned projects (student or otherwise). MSc and PhD bursaries are and will be available for South African and other African students from participating countries. At the moment, these scholarships are in the areas of multi-frequency hydroacoustics, jellyfish and neuston, but this could expand depending on needs and funds. There has never been a better time to get involved in African marine science, and all interested persons are urged to contact the author.

Source:

Mark J. Gibbons. A landmark in African marine science. *Quest*, 2018; 14(2): 14. Ø

Collaborative research and training opportunities in African marine science for African students

The EAF-Nansen Programme is developing partnerships with academic and training institutions to strengthen capacity in fisheries research in partner countries. The National Research Foundation (NRF) of South Africa has made available 15 scholarships at MSc or PhD level for researchers from South Africa and from the fisheries research institutions partner to the EAF-Nansen Programme, through a grant to Prof Mark J Gibbons at the University of the Western Cape (UWC). These opportunities are in the areas of multifrequency hydroacoustics; jellyfish genetics, taxonomy and biology; the trophic ecology of mesopelagic organisms; and nekton community ecology and population genetics. The EAF-Nansen Programme invites researchers working in fisheries research institutions with an interest in the scientific areas mentioned above to submit their application to the training programme. [Click here for more information.](#)

Aquaculture key to food security and nutrition?

As the pressure grows on the world's arable land, aquaculture must play a bigger role in food production if we are to feed a population of 9.8 billion by 2050, as estimated by the United Nations, says University of Cape Town (UCT) Emeritus Professor John Bolton.

The topic underpinned Bolton's South African Network for Coastal and Oceanic Research (SANCOR) Gilchrist Memorial Lecture at Nelson Mandela University on 15 November. He received the Gilchrist Memorial Medal last year for his many contributions to marine science.

Bolton is a leading expert on the biology and phylogeography of seaweeds, South African kelp forests, and integrated seaweed-marine animal aquaculture. His lecture was titled "The seaweed revolution: biology, aquaculture, nutrition".

"There is a growing understanding that if we are to [be able to] feed people in 2050 we have to do things differently, and that the global land area will not be sufficient for food production," he said.

"Although more than 70% of the

globe is sea, it is also becoming clear that aquaculture practices will have to become more sustainable than they currently are.

"We will increasingly need to practise integrated aquaculture, growing organisms that are extractive ('unfed'). These include filter feeding molluscs such as mussels and oysters, which eat particles, and seaweeds, which remove dissolved nutrients, both of which are released in large quantities in traditional fed aquaculture."

Seaweeds are critical to this future.

"Global seaweed production is currently almost entirely in East Asia so far but has been growing at 8% per year for the last 30 years, the fastest growing world food sector."

Nutrition high, calorie low

Nutritionally, seaweeds as a food are said to contain "everything except calories".

"They can add a multitude of flavours and textures and are now the basis of dishes in most Michelin-starred restaurants in



Emer Prof John Bolton at his Gilchrist Memorial Lecture at Nelson Mandela University. Photo: Carmen Visser.

Europe," said Bolton.

"There is a rapidly expanding research literature demonstrating a remarkable range of health improvement effects for seaweeds in the human diet."

He added that the market for seaweeds as "functional foods", offering more than just standard nutrition, is rapidly expanding in Western countries.

"This includes their benefits as prebiotics, helping to create a healthy gut bacterial flora, and there are many studies linking dietary seaweeds to improvements in animal

immune systems.”

As the need for seaweeds as a critical component to improve the sustainability of marine aquaculture is becoming clear, there’s been a large rise in research throughout the world on the development of a “biorefinery model” for dealing with the seaweed production.

“This involves the extraction of a wide variety of products from seaweed biomass, from the high end of the market, such as human food, nutraceuticals [and] cosmetics, to lower-priced commodities such as animal feed, colloids, bioplastics, and even biofuel.”

Growing research

Bolton has published extensively, not only on the seaweeds of South Africa but also of Namibia, Angola, Madagascar, the Éparses Islands of the Mozambique Channel, Kenya, Mauritius and Reunion. For more than 30 years he has served as the principal investigator on almost all seaweed-based National Research Foundation projects.

Though recently retired after 35 years in the Department of Biological Sciences and now a senior research scholar at UCT, he remains actively involved in aquaculture



“If we are to feed people in 2050 we have to do things differently.” – Emer Prof John Bolton sampling in a seaweed raceway on a commercial abalone farm. Photo Mike Stekoll.

research and postgraduate teaching in the area.

The backdrop to his Gilchrist lecture is the growing appreciation in Europe of his research group’s work on South African seaweed aquaculture.

First, he said, there has been a dramatic increase in research worldwide on the incorporation of seaweeds into marine aquaculture, with several large European projects involving “integrated aquaculture” of seaweeds with marine animals.

His group has carried out a significant body of work into the integration of seaweeds into the local land-based aquaculture of

abalone. This provides feed and enables partial water recirculation, and is seen as a pioneer commercial success story of sustainable aquaculture.

Second, in mid-2017 the European Union (EU) and governments of South Africa and Brazil signed the Belem Agreement to extend the large network of marine science projects in the North Atlantic Ocean into the South Atlantic.

“There is now an enormous new opportunity for South African marine scientists to link with EU partners on oceanography, aquaculture and marine biodiversity of the Atlantic Ocean, including specific project calls in the EU Horizon2020

programme,” said Bolton.

Serving aquaculture and seaweeds

Far from slowing down after his retirement, Bolton has travelled far and wide this year in service of aquaculture and seaweed research. He was an international panel member on a review of the environmental science BSc degree at the University of the Seychelles. This invitation came courtesy of former UCT postdoctoral research fellow, and now senior lecturer at that university, Dr Laura Blamey.

He followed this by presenting a keynote address on the seaweed revolution and the problem of naming seaweed species at the inaugural “Seaweed4Health” conference, in Ireland in June. He also attended two conferences in France.

The EU sponsored his trip to Montpellier in August, where he contributed to a panel discussion on new and emerging technologies to service societal needs and new value chains. This was at the joint meeting of the World and European aquaculture societies.

Bolton was then funded by the Brest Metropole to attend the Sea Tech

Week conference on marine bioresources in Brittany in October, as an invited plenary panel member. His topic, “To what extent is sustainable aquaculture viable?”, is at the heart of his research.

Commercially viable

Although integrated aquaculture has been discussed for more than 20 years at major conferences, it has not yet become a commercial reality in Europe, Bolton pointed out.

“Aquaculture is an industry and aquaculture operations need to be not only environmentally sustainable but [also] profitable. This has been proved over many years on South African abalone farms which grow the sea lettuce *Ulva* in abalone effluent to produce feed for the abalone.

“Some farms also use the *Ulva* to remove harmful ammonia from abalone effluent (bioremediation), enabling partial water recirculation, saving up to 40% on water pumping costs and greatly reducing the ecological footprint of the operation.”

Bolton’s group has contributed significantly to the development of this system.

Source:

Swingler, H. and Bolton, J. (2018, November 19). Aquaculture key to food security and nutrition? Retrieved from <https://www.news.uct.ac.za/news/research-office/-article/2018-11-19-aquaculture-key-to-food-security-and-nutrition>



Drinking from the source: a thought provoking WILDOCEANS Ocean Stewards science session

By

Apelele Zonda

*South African Institute for
Aquatic Biodiversity*

The Ocean Stewards Fellowship is a WILDOCEANS education, training and ambassadorship programme which aims to expose marine science students from five higher learning institutions across South Africa, to practical marine conservation work. The programme seeks to address the lack of hands-on field experience, which is prevalent and limiting among marine science graduates. Through donations, barter partnerships and strategic partners, WILDTRUST is investing in the development of incoming marine conservation graduates. It encourages ambassadorship and provides an interaction platform for students and scientists.

Established in 2015, the fellowship has been fuelling passion and enthusiasm for marine conservation and stewardship within the scientific community. Since its inception, the Fellowship has held an annual



2018 WILDOCEANS Science session attendees, on the first day. Photograph by Jordan Milton (Milton Media).

science session. This is a platform for all the stakeholders to meet and discuss current issues in marine conservation. This year, the science session was held at the Howard Campus of the University of Kwa-Zulu Natal (UKZN) from 17 - 20 September. The event focused on Marine Protected Areas (MPAs) and the Blue Economy allowing fruitful discussions and engagement between students, established scientists and industry representatives on the current state and future of South African marine resources. As students are the pillar of the event, a group of

Masters Students were given the opportunity to present their current work to the audience.

Over four days, students and interns were able to interact with scientists and industry representatives, receive science communication training from Jive Media Africa, and were informed on current research platforms and available research projects. At the dinner the students' passion and enthusiasm for advocacy and stewardship in marine conservation was highlighted. On the last day, students and interns participated in a closed round of FameLab heats.

FameLab is an international science communication platform hosted by the British Council. The training and competition proved to be excellent exercises for students to practice the communication skills they had learned.

The event was graced by numerous marine conservation experts including Margo and George Branch, Mandy Lombard, Jenny Hugget, Judy Mann-Lang, amongst others. These experts represented numerous organisations such as the Department of Environmental Affairs (DEA), World Wide Fund for Nature (WWF), Ezemvelo KZN Wildlife (EKZN), South African Environmental Observation Network (SAEON), (South African Association for Marine Biological Research) SAAMBR, and the National Sharks Board (NSB). With the topic of conversation being MPAs and the Blue Economy, experts gave their experiences working with MPAs in the South African context.

Focusing on the social aspects of MPAs for marine scientists, Dr Judy Mann-Lang gave a detailed talk on all the challenges a scientist may have to be aware of when working with MPA stakeholders. In her talk, she used an example of her recent

experience with governance issues brought about by contentious opening of coastal sections in the Tsitsikamma MPA. Her talk put into perspective the need for incoming marine scientists to be equipped with science communication skills. She told the Ocean Stewards, "We went into this not thinking about it a science communication task, and we were not even considering it a campaign".

Nomxolisi Mashiyi, the Environmental Affairs Director of Youth Development, expressed how impressed she was with the calibre of the Ocean Stewards following a talk given by one of the students, Sizo Sibanda. To date, the Ocean Stewards Fellowship has nurtured a group of passionate and inspired students, such as Sizakele Sibanda from the University of Cape Town (UCT). Sibanda gave a presentation of her work on the South African MPA network, focusing on the benefits of these MPAs. "Events such as the Ocean Stewards science session place a spotlight on the marine environment and the research needed to understand it better. Not just for the benefit of industry but also in the context of a

changing climate and how to protect the environment which delivers benefits to so many people," said Sizo.

Mashiyi motivated the youth to continue their hard work for conservation and encouraged the incoming marine biologists to continue improving science communication, specifically with local coastal resource users: "You need to understand that the local elders have their own indigenous understanding of conservation and you must take advantage of this by incorporating this knowledge into your own understanding, to achieve optimum community cooperation," she told the stewards.

As a developing country, South Africa is growing each day and so is the need for natural resources such as those that come from the ocean. This growth is paralleled by the need to mentor and capacitate young marine scientists to ensure sustainable marine resource management going forward. '∅

Funding basic research plays the long game for future payoffs

The U.S. Senate recently proposed to increase the research budgets of the National Institutes of Health, National Science Foundation and NASA. While this is encouraging to the many scientists whose research is dependent on grants from these agencies, it comes at a time when scientific research is under increased scrutiny.

Questioning the merit of scientific research is certainly not new. In the 1970s and 1980s the Golden Fleece Awards were an ignominious honor bestowed by a U.S. senator on what he considered “wasteful” research. The majority of the ire was aimed at research thought to be “useless.”

But having no obvious immediate application doesn’t mean something will never be of use.

Perhaps the difficulty in justifying basic research is in part a branding problem. The goal of this type of work is to understand the fundamental principles of nature, and it spans the STEM fields (Science, Technology, Engineering and Mathematics). Once these



What could a bioluminescent jellyfish contribute to medical science? LagunaticPhoto/Shutterstock.com

fundamental principles are understood, they can be applied to more translational research that can have direct benefits to patients or consumers.

But the benefits of basic research are often not instantly recognizable. Potential long-term payoffs – perhaps ones that haven’t even been imagined yet – won’t help consumers or patients now.

There are countless discoveries whose eventual impact would have been very difficult to predict when

the research was in its infancy. Honors like the Golden Goose Award, presented every fall since 2012, combat the idea of basic research being “wasteful” or “useless” by underscoring that it’s actually the foundation for further scientific innovation. Given enough time and support, basic research can yield significant real-world benefits that were hard to predict in advance. Here are two examples of scientific curiosity paying substantial dividends decades after the initial discovery.

From glowing jellyfish to biomedical imaging

It was very unlikely that scientists were thinking of medical applications when in the 1950s they started studying why some jellyfish glow. Marine biologists discovered that the jellyfish *Aequorea victoria* was bioluminescent. What was unclear at the time was how this jellyfish produces its light, which is a vibrant green color.

Seven years later a group of researchers discovered that the living light from the jellyfish came from a single protein they called aequorin. Strangely, the light from the purified aequorin protein was blue, not green. After another eight years of work they found that a partner protein to aequorin, which they called green fluorescent protein (GFP), produced the vibrant green-colored light seen in the living jellyfish.

The question then became how did the two proteins work together to produce this light? It took another 10 years of work to get the answer. A series of papers published in the early 1970s characterized a small molecule called a chromophore that

integrated into the GFP protein structure. The structure of GFP was discovered in the early 1990s, which further helped researchers understand how this protein created light in living cells.

The first time the GFP protein was produced in an organism other than a jellyfish was in 1992. Expressing GFP in the small worm *C. elegans* and the bacterium *E. coli* made them both glow a brilliant green color. This breakthrough, nearly 40 years after the initial jellyfish study, opened the door for using GFP as powerful tool for biomedical research. Today researchers use GFP to track protein interactions and movement in living cells, which is useful in the study of cancer and bacterial diseases. A current literature search in PubMed returns over 30,000 peer-reviewed published papers using the search term "green fluorescent protein."

The impact of GFP has also been recognized with a Nobel Prize in 2008 and an inaugural Golden Goose Award in 2012.

From bacterial immunity to genome editing

A more recent example of how basic research is now driving incredible innovation can be found in the fields of synthetic biology and genome editing, thanks to what actually started out very humbly as the characterization of bacteria. In the late 1980s, researchers found that certain bacteria had short repeated regions in their genome, but they didn't know their purpose. They called these DNA sequences Clustered Regularly Interspaced Short Palindromic Repeats; you've probably heard its acronym nickname CRISPR. Work characterizing and cataloging bacteria that had these short repeated sequences continued for 20 years before researchers discovered proteins associated with the short DNA repeats. They called them CRISPR associated, or Cas, proteins.

One major advance happened in 2005 when researchers realized that CRISPR sequences found in bacterial genomes match DNA in phages, viruses that infect bacteria. A few more years later, scientists showed that the CRISPR-Cas system was a type of adaptive immunity that

bacteria use to remember phage infection and prevent it from happening again. The Cas protein cuts invading phage's DNA to stop infection. This discovery was groundbreaking; no one had known something as simple as a single-celled bacterium could have a sophisticated immune system.

And then in 2013, researchers realized this type of directed DNA cutting could be used to edit the genomes of other organisms, not just bacteria. The method was quickly adapted for use in yeast, worm, fruit fly, zebrafish, mouse, plant and human cells. Genome editing in this way will have far-reaching implications for everything from food production to stem cell therapies.

Thirty years after its discovery, the scope of CRISPR research is truly impressive; a current literature search in PubMed returns over 10,000 peer-reviewed published

papers using the search term "CRISPR." The technologies stemming from CRISPR have not won a Golden Goose Award or Nobel Prize yet, but some speculate it is only a matter of time.

Curiosity and patience yield dividends

Answering fundamental questions – Why do jellyfish glow? Why do bacterial genomes have short repeating DNA sequences? – can lead to innovation and tangible benefits in many aspects of everyday life. And a Golden Goose Award or Nobel Prize is not required to show that a discovery has translational application. An entrepreneurship study published in 2017 highlighted that more than 75 percent of research articles published are eventually referenced in at least one patent disclosure. This study showed a strong link

between patent applications, ostensibly a quantitative metric of innovation, and basic research taking place at universities and government laboratories.

Real-world impacts stemming from basic research can take decades to unfold. If basic science is not supported and funded in the U.S., other countries will take over the innovation leadership role. Much like the goose that laid golden eggs, time and patience are required to get the most out of basic research.

Source:

Gardner, J. (2018, August 7). *The Conversation* US. Funding basic research plays the long game for future payoff. Retrieved from <https://theconversation.com/funding-basic-research-plays-the-long-game-for-future-payoffs-100435> ↗



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ATAP Anecdotes: Hammerheads getting nailed

By

Taryn Murray, Matt Parkinson & Paul Cowley

South African Institute for Aquatic Biodiversity

Hammerhead sharks are undoubtedly amongst the most recognisable species of shark on the planet. This group consists of nine species which are widespread in temperate and tropical seas, and includes the great hammerhead (EN)*, scalloped hammerhead (EN), smooth hammerhead (VU), smalleye hammerhead (VU), Carolina hammerhead (no assessment), bonnethead (LC), scalloped bonnethead (NT), winghead (EN) and scoophead (DD) sharks. Many of these species are under threat due to various anthropogenic impacts including overfishing and a demand for their fins, which are considered a delicacy.

Legislation has been put in place that aims to protect hammerhead species in South Africa. In 2011, retention of all hammerhead species was banned in the pelagic longline fishery, and in 2015 catches were further prohibited in all commercial



A juvenile smooth hammerhead shark being released after transmitter implantation. Photo by Paul Cowley.

fisheries except for the linefishery (da Silva *et al.* 2015, Dicken *et al.* 2018). The bycatch of juvenile hammerhead sharks in the coastal demersal longline fishery has also been recorded. The KZN bather protection programme is an additional source of fishing mortality, where it is the 14th most commonly caught shark species (Dicken *et al.* 2018).

Two species of hammerhead sharks occur off the South African coast; the scalloped hammerhead *Sphyrna lewini* and smooth hammerhead *Sphyrna zygaena*. The smooth hammerhead occurs in

*IUCN Red List categories:

EN – Endangered,

VU - Vulnerable,

NT – Near threatened

LC – Least concern

DD – Data deficient

temperate and tropical seas and has a more widespread southern African distribution compared to the scalloped hammerhead, extending from St Helena Bay in the Western Cape to southern Mozambique. This species can reach 4 m in length and a weight exceeding 160 kg. Their maximum age is currently unknown, although it is thought to exceed 20 years of age.

Smooth hammerheads are one of the least studied pelagic sharks and little is known about its movement patterns, habitat use and population dynamics for any part of its southern African distributional range. According to the Oceanographic Research Institute's Cooperative Fish Tagging Project (ORI-CFTP), 1625 smooth hammerheads have been tagged with conventional dart tags since 1984 and only 21 have been recaptured (1.29%). The average distance moved by these individuals was 139 km, and a maximum distance moved of 384 km has been recorded. This species is thought to be migratory, with juveniles occurring closer inshore, moving offshore with an increase in size. However, more information on their movement behaviour is needed.

ATAP researchers opportunistically tagged three juvenile smooth hammerhead sharks, which have shed some new light on their movements along the South African coastline. Two individuals were subsequently detected on the ATAP array. One individual, tagged near Vleesbaai, Western Cape on 22 February 2016, was subsequently recorded in Mossel Bay (between 17 and 20 March 2016) before moving eastwards to Plettenberg Bay where

it was detected for one day (06 May 2016) before disappearing from the array. Similarly, the other individual, tagged in the same area on 26 February 2016, was recorded six days later on a receiver near the De Hoop Marine Protected Area, approximately 100 km to the west of the release site (travel speed of almost 17 km/day). It then moved eastwards to Mossel Bay, spending two days (17 and 18 April 2016) there before moving another 130 km eastwards to Plettenberg Bay, where it was recorded sporadically for 21 days between 22 April and 12 May 2016. It disappeared from the array for three months, before being detected in Algoa Bay (approximately 300 km eastwards) on 28 August 2016. Within Algoa Bay it moved between the Islands of the Cross (Jahleel, St Croix and Brenton) and Bird Island for approximately three and a half months. This individual was last detected on 15 December 2016 on the Brenton Island receiver in Algoa Bay. The maximum distance this animal moved was at least 530 km. These preliminary results clearly suggest that juvenile smooth hammerhead sharks are highly mobile, making regular long distance movements.

Hammerhead sharks are commonly caught as bycatch by recreational shore anglers, forming an important component of the competitive shore fishery in KwaZulu-Natal and the former Transkei. Although all captured sharks are released in this fishery, they are vulnerable to capture stress and susceptible to post-release mortality (Coelho et al. 2012, Gallagher *et al.* 2014). The fact that one of the tagged sharks was never recorded suggests that it could have succumbed to capture (and tagging) stress post-release. However, two of the sharks survived the capture and tagging event and were subsequently detected by the ATAP array. These hammerheads were tagged with long-life transmitters with a battery life of 10 years, but were recorded for less than one year. It is possible that these two sharks succumbed to some other form of fishing mortality, such as from the demersal longline shark fishery that operates along the southern Cape coastline, or natural predation. Acoustic telemetry not only provides important information on the movement behaviour of animals, but can also provide insights into their vulnerability to fisheries.

References

Coelho R, Santos MN, Amorim S. 2012. Effects of hook and bait on targeted and bycatch fishes in an equatorial Atlantic pelagic longline fishery: Part II – Target, bycatch and discard fishes. *Bulletin of Marine Science* 88: 449–467. doi: 10.1016/j.fishres.2014.11.009.

da Silva C, Booth AJ, Dudley SFJ, Kerwath SE, Lamberth SJ, Leslie RW, 2015. The current status and management of South Africa's chondrichthyan fisheries. *African Journal of Marine Science* 37: 233–248. doi: 10.2989/1814232X.2015.1044471.

Dicken ML, Winker H, Smale MJ, Cliff G. 2018. Sharks caught in the KwaZulu-Natal bather protection programme, South Africa. 14. The smooth hammerhead shark *Sphyrna zygaena* (Linnaeus). *African Journal of Marine Science* 40: 157–174. doi: 10.2989/1814232X.2018.1470031.

Gallagher AJ, Serafy JE, Cooke SJ, Hammerschlag N. 2014. Physiological stress response, reflex impairment, and survival of five sympatric shark species following experimental capture and release. *Marine Ecology Progress Series* 496: 207–218. doi: 10.3354/meps10490.

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Source: <https://kids.frontiersin.org/>

Passing of visionary leader, Dr Edna Molewa

The Deputy Minister of Environmental Affairs, Ms Barbara Thomson, and the Director-General of the Department, Mrs Nosipho Ngcaba, have expressed shock and sadness at the passing of the Minister of Environmental Affairs, Dr Edna Molewa, in Pretoria on 22 September 2018.

South Africa and the international community has lost a true champion of the cause of environmental justice and sustainability as a foundation for equitable socio-economic development. Since almost the dawn of our democracy she actively spearheaded the transformation of environmental governance architecture at provincial, national and international levels.

On becoming national Minister of Water and Environmental Affairs in 2010, Dr Molewa immediately prioritised the global climate change crisis at both an international and national level. As part of this effort, she facilitated the development of our national climate change response policy that was approved by cabinet in 2011. This policy includes a range of measures aimed at achieving both South Africa's overall national goals reflected in the

National Development Plan and our commitments made under the UN Framework Convention on Climate Change (UNFCCC).

Dr Molewa did not only focus on climate change, she provided extraordinary vision, inspiration and leadership for the whole spectrum of issues and challenges in the environmental sector. As visionary leader within government, Dr Molewa quickly saw the potential of the Malaysian "Big Fast Results" participative planning methodology that has been adapted for application in South Africa as the Operation Phakisa methodology. Using this approach she facilitated the development of 3 Operation Phakisa programmes aimed at fully tapping into the socio-economic development potential of the environment sector in accordance with Section 24 of the Constitution. The first of these integrated Operation Phakisa programmes was the Ocean Economy, followed by the Biodiversity Economy and the Chemicals and Waste Economy Phakisa programmes.

Dr Molewa launched an Operation Phakisa for the Oceans Economy



Dr Edna Molewa. Photo by Martin Rhodes.

and, working in partnership with other relevant government departments, drove the development of the Blue or Oceans Economy, including focus areas on maritime transport, shipbuilding, offshore oil and gas exploration, aquaculture, port development, industrial zone development adjacent to ports, marine and coastal tourism, as well as, research and technology and oceans governance.

She repeatedly emphasized that the world's economic relationship with the ocean was evolving. She believed that due to the environmental damage being caused to the oceans through, amongst others, over-fishing, oil and plastic pollution, there was a need to promote a more sustainable balance between economic growth and ocean health. She was convinced that

securing zones for conservation of coastal and offshore areas through declaring Marine Protected Areas was essential to economic development that secures marine life for current and future generations.

Dr Molewa was passionate about enhancing South Africa's role in the ocean and coastal environment, Antarctica and islands in the Southern Oceans. To this end she played a key role in driving the procurement and delivery of the South African research and polar supply vessel, the *SA Agulhas II*, built in 2012 under Dr Molewa's leadership, and dedicated to our icon, Mama Miriam Makeba. The vessel has been the basis for the cutting edge scientific research at Antarctic and Prince Edward Islands, and demonstrates her foresight and understanding of investing in knowledge production and the important role of science in the Antarctic and Southern Oceans. She presented ocean science work as a concrete deliverable to the Indian Ocean Rim Association, stating that Africa must understand and value her ocean to really benefit from the opportunities that the ocean presents. Dr Molewa launched the first of these Indian Ocean Cruises in October 2017. She insisted that the excellent scientific research undertaken must be translated into

knowledge that South Africans can easily access so the ocean and coastal opportunities and threats can be engaged with at all levels.

Internationally, she led South Africa in discussions for the development of a BRICS Oceans Economy programme through sharing of best practices, technology and skills development whilst paving a way for investment attractions in these key areas.

She sadly passed on whilst in the process of finalising the 2018 National Framework for Air Quality Management which was to bring a shift in air quality management space and gear the country towards cleaner production.

The Department's Director-General, Ms. Nosipho Ngcaba has described Minister Molewa's passing as "a devastating loss, not just for her family, but for the sector and the country."

"She was a woman of substance, a visionary leader, knowledgeable, hardworking, a reader, driven to achieve tangible outputs and outcomes, her passion and immense knowledge in the field of environmental management was exemplary. Myself and the DEA family including South African National Parks, South African

National Biodiversity Institute, South African Weather Service and Isimangaliso Wetland Authority are saddened that her efforts and commitment to actively contribute to people prosperity through the green goal in South Africa, and global environmental benefits for a better Planet, are now lost to the world," said Ms. Ngcaba.

The Deputy Minister and Director-General have expressed their condolences to her children, mother, sisters, brothers and the broader family; adding that she would be sorely missed in the Department by all its employees as well as her staff in the Ministry.

"She was not just the leader of our Department, she was a much valued colleague, mentor to some, and a friend," said Deputy Minister Thomson.

[Click here for the full media release.](#)

Source:

Department of Environmental Affairs. Deputy Minister Ms Barbara Thomson and staff of the department mourn the passing of Dr Edna Molewa. (2018, September 25). Retrieved from https://www.environment.gov.za/mediarelease/thomsonandstaff_mournthepassingofministermolewa ☞

UCT and the Weddell Sea Expedition

When the Weddell Sea Expedition departs for Antarctica next year, UCT oceanographers will be among those on board: Dr Sarah Fawcett, Dr Katherine Hutchinson and several UCT students. We found out why the expedition matters and what research they hope to accomplish while they're in one of the most remote regions on the planet.

UCT was one of only a handful of institutions approached to participate in the Weddell Sea Expedition 2019. This almost unprecedented scientific expedition – a joint venture between organisations in the United Kingdom, the Netherlands, South Africa and New Zealand – hopes to survey the underside of the Larsen C Ice Shelf, document the marine wildlife of the Weddell Sea ecosystem and find the wreck of Sir Ernest Shackleton's ship *Endurance*, which sank there in 1915.

The scientists who make up the expedition will travel to the Weddell Sea at the edge of Antarctica aboard the South African vessel R/V *SA Agulhas II* during January and February 2019. Among the glaciologists, marine biogeochemists and archaeologists will be UCT oceanographers Dr Sarah Fawcett, who lectures in oceanography, and Dr Katherine Hutchinson, who



The Weddell Sea Expedition is a joint venture between organisations in the United Kingdom, the Netherlands, South Africa and New Zealand. Photo Daniel Schilperoot.

recently completed her PhD.

A window into time

"This will give us an unprecedented opportunity to investigate and explore one of the most remote and least-studied places on our planet," says Associate Professor Isabelle Ansoorge, head of the Department of Oceanography.

According to former head of the oceanography department at UCT, Emeritus Professor Geoff Brundrit, UCT's involvement with the Weddell Sea Expedition recognises its long and growing expertise in the Southern Ocean. "UCT scientists have made a significant contribution to research in this area, both in the knowledge of the important processes at work in the Southern Ocean and for advancing understanding of their implications for global climate change."

According to Ansoorge, the Weddell Sea is of importance to oceanographers because many of the waters and nutrients that control the structure and functioning of ocean systems originate in the area.

"Due to differing water densities the ocean is divided into layers," she explains. "There is the bottom water, the deep water, the intermediate and the surface water. Just off Antarctica there is a water mass called the Antarctic bottom water, which forms along the shelf region in the Weddell Sea, and simply put, creates a waterfall effect down the side of the continental shelf due to its high density. This water mass then travels to all of the sea basins, so whatever happens there really influences the rest of the ocean."

Fawcett explains that this influence includes the transport of heat and gases, as well as nutrients, like phosphorus and nitrogen, which all ocean life require.

Fawcett and Hutchinson will be measuring all the physical characteristics of the area, from the salinity of the water to the temperature and carbon dioxide (CO₂) concentrations. "While we are there, I will also be looking at the isotopes that are present," says Fawcett. "The nitrogen isotopes, for example, will allow us to tease apart and thus better understand the different overlapping biological and chemical processes ongoing in the area."

Fawcett will also be working with marine biologist Dr Tommy Bornman from Nelson Mandela University and the South African Environmental Observation Network to investigate the sea's biological community and the rate of photosynthesis and nutrient cycling by its phytoplankton communities.

"We will be looking at questions like how the extended daylight hours affect photosynthesis and how quickly CO₂ is being removed," she says.

"The R/V *SA Agulhas II* is one of the most modern research ships on the planet, equipped with a huge array of cutting-edge scientific

instruments," says Fawcett. "While the expedition is in the Weddell Sea, scientists will also be flying drones over the ice as well as sending remotely controlled robotic autonomous vehicles under it."

Tracking climate change

The Weddell Sea is the site of the Larsen Ice Shelves. The Larsen A and B ice shelves collapsed in 1995 and 2002, respectively, and in July 2017, one of the biggest iceberg calving events ever recorded took place when a piece of the Larsen C Ice Shelf broke off from the mainland.

"In the past we have been able to view the ice from above using satellite imaging and photographs taken from planes," explains Fawcett. "But this will be a chance for us to examine the underside of the ice shelf, which is highly significant because evidence shows that the Weddell Sea is warming and these ice shelves are retreating at unprecedented rates."

Ice shelves are influenced both by what occurs in the water below them as well as the atmospheric conditions above them, making them particularly important bellwethers in understanding the rate of climate change.

"The thing about the ice shelves is that if they melt, they don't raise sea levels themselves because they



Autonomous underwater vehicles will be used to survey the sea floor beyond 3 000 metres down to study cavities on the underside of the ice shelf and search for the wreck of *Endurance*. Photo supplied.

are already in the ocean. But if they go, then the ice behind them – on the land – is more likely to start flowing towards the ocean, displacing seawater as it enters the ocean, thus causing sea levels to rise," explains Fawcett.

"Hopefully the team will be able to visit the chasm that has opened up between the ice shelf and the iceberg that broke off in 2017," says Anson. "To visit such a place, at this time, and see what almost no-one else has seen is an awe-inspiring thought."

Source:

Nicolson, A. (2018, October 18). UCT and the Weddell Sea Expedition. Retrieved from <https://www.news.uct.ac.za/news/research-office/-article/2018-10-18-uct-and-the-weddell-sea-expedition>

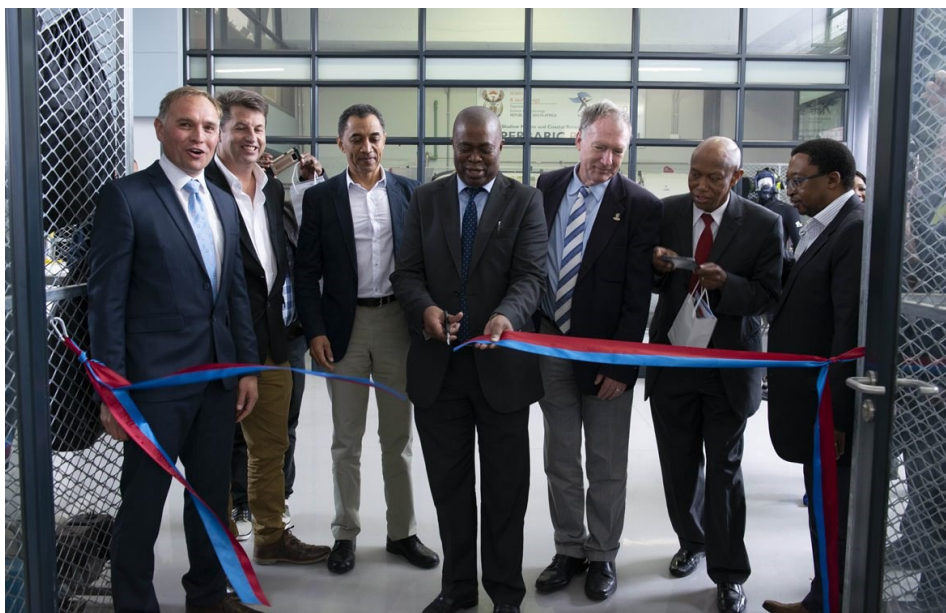
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New research initiative to reduce SA's coastline vulnerability to global change

South Africa's oceans play a vital role in Southern Africa's climate and weather patterns, and also influence the climate globally. However, ongoing pollution, climate change and other factors are threatening these oceans. In a bid to lessen the risk and vulnerability of the coastal zone to climate and global change, the Department of Science and Technology, the National Research Foundation (NRF) and Nelson Mandela University (NMU) launched the Shallow Marine and Coastal Research Infrastructure (SMCRI) on 19 October 2018 to research the country's shallow coastline.

Based at NMU's Ocean Sciences campus, the SMCRI is one of 13 large research infrastructures developed as part of the South African Research Infrastructure Roadmap (SARIR). The SMCRI was established in 2016 to develop an array of instruments and physical research platforms around the coasts of South Africa and its sub-Antarctic islands to collect long-term reliable data for scientific research. This will help decision makers formulate appropriate environmental policies.

Through the SMCRI, observatories and research platforms will be deployed at key sites along the coast to improve the country's understanding of the key drivers of change, the potential ecosystem and the socio-economic responses needed. The infrastructure will provide direct data to grow the blue economy, especially in the key sectors of fishing, aquaculture, oil and gas, shipping, mining and coastal development.



Department of Science and Technology director-general, Phil Mjwara (centre), flanked by Nelson Mandela University's Deputy Vice-Chancellor for Research and Engagement, Prof Andrew Leitch (right) and Prof Derrick Swartz (left), and colleagues from the National Research Foundation (NRF) and the foundation's South African Earth Observatory Network (SAEON), cuts the ribbon to the SMCRI Central Coordination Unit based at the university's Ocean Sciences Campus.

The blue economy has been identified as the next major contributor to South Africa's gross domestic product, with the potential to create up to a million direct jobs and contribute R177 billion to the country's economy by 2030.

Speaking at the launch of the SMCRI at NMU's Ocean Sciences Campus, Director-General of Science and Technology, Dr Phil Mjwara, said the response to global change was one of the grand challenges the DST has identified.

"South Africa is well positioned to lead research on the continent in terms of understanding and projecting changes to the marine environment, the impact of these changes, and mitigation to limit

their long-term effects," said Dr Mjwara, emphasising the need for the country to take full advantage of the marine wealth it has.

He added that mitigating climate change effects would go a long way towards achieving South Africa's blue economy imperatives.

"In the development of the 'blue economy', the exploitation of living (fisheries, aquaculture, tourism) and non-living marine resources (oil and gas, minerals, energy) should be on a scale that is socially and economically justifiable and ecologically sustainable," he said.

This against the background that ongoing pollution, climate change and other factors threaten the world oceans, which has a direct impact on

changing weather patterns.

Mandela University’s Deputy Vice-Chancellor for Research and Engagement, Prof. Andrew Leitch, said the SMCRI was in line with transdisciplinary work that the institution had undertaken in the ocean sciences over the years.

"Two years ago, the university pulled all its marine research into one unit – the Centre for Coastal and Marine Research and we are happy to report that students and academics from all faculties are involved in that – aligned with our transdisciplinary approach," he said.

Prof Leitch added that the newly

launched research infrastructure would support the work done in one of the institution's newly redefined research themes, one of which is ocean and coastal sciences.

Also addressing the launch, the NRF CEO, Dr Molapo Qhobela, said the power of producing knowledge through research infrastructures should not be underestimated. Oceans were a source of income, and a means of importing goods, supporting the country's economy.

Dr Qhobela welcomed the partnership to establish the SMCRI, expressing pleasure at seeing a group of people coming together to

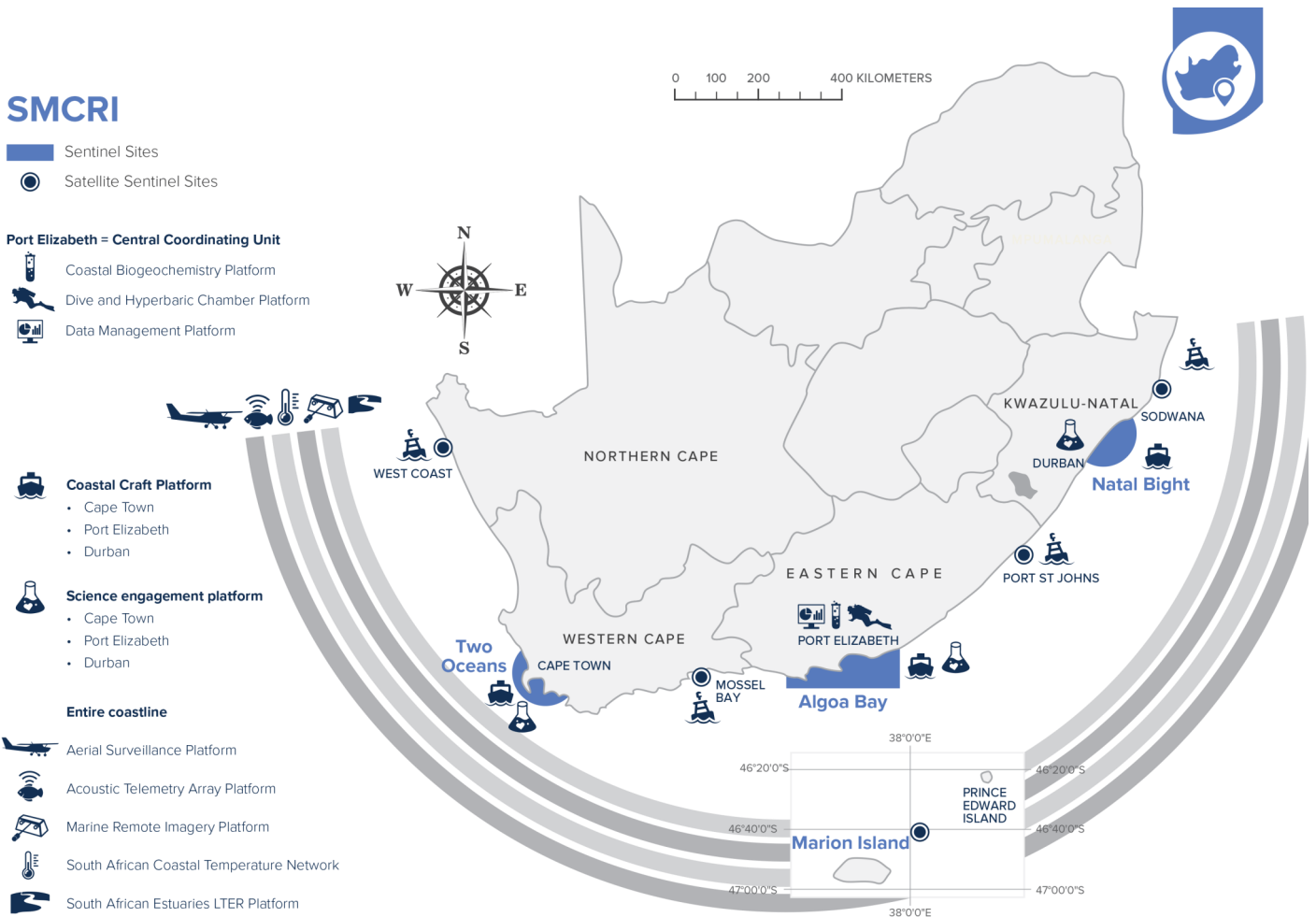
share expertise towards a common endeavour.

The SMCRI is managed by the Coastal Node of the NRF's South African Environmental Observation Network, which is based in Port Elizabeth, and the South African Institute for Aquatic Biodiversity, which is based in Grahamstown.

Source:

New research initiative to reduce SA's coastline vulnerability to global change. (2018, October 22). Retrieved from <https://news.mandela.ac.za/News/New-research-initiative-to-reduce-SA-s-coastline-v-en>

The Shallow Marine and Coastal Research Infrastructure



Norwegian delegation visit to the NRF

On 30 October the NRF CEO, Dr Molapo Qhobela, hosted a high-level delegation from Norway, including representatives from the Ministry of Education and Research, and the Research Council Norway (RCN). The Minister of Research and Higher Education, Ms Iselin Nybø was accompanied by the Ambassador for Norway in South Africa, HE Astrid Helle.

The NRF has a long-standing science and technology agreement with Norway mainly through the RCN, with collaboration focused on joint funding of collaborative research projects between South African and Norwegian researchers through the prominent SANOCEAN programme. Strategic discussions focused on innovation and renewal of partnership arrangements to focus on broad-based research in ocean sciences, the environment and health. New initiatives for human capacity development, focussing on PhD and post-doctoral research opportunities, regional cooperation with an emphasis on the Indian Ocean Rim and the Atlantic, the new Horizon Europe EU programme, specific university interventions, infrastructure development and

access, and potential for industry support, were agreed.

A large delegation of Rectors, Deans and Directors from Norwegian universities and research institutions participated in a series of events in South Africa during the week, including a seminar on Sustainable Societies at the NRF on 31 October.

In addition to the Minister and Ambassador, the Norwegian delegation consisted of: Toril Johansson, Director-General at the Ministry of Education and Research (MER); Joakim Bakke, Deputy-Director General at MER; Mari

Sundli Tveit, Executive Director at the Research Council Norway (RCN); Kristin Danielsen, International Director at RCN; Jan Haakonsen, Special Adviser at RCN; Alf Rasmussen, Secretary General for Universities Norway; Alf Friisø, Counsellor, and Karl Klingsheim, Science Counsellor, Royal Norwegian Embassy in Pretoria.

Source:

National Research Foundation. Norwegian Delegation visit to the NRF. (2018, October, 30) Retrieved from: <https://www.nrf.ac.za/media-room/news/norwegian-delegation-visit-nrf> ☞



The NRF hosted a high-level delegation from Norway, including representatives from the Ministry of Education and Research, and the Research Council Norway (RCN).

Climate Change and the Ocean: A Stark Message from the IPCC

On October 8, the Intergovernmental Panel on Climate Change (IPCC) released a jaw-dropping report that laid bare the choices that we must make to ensure a livable and equitable future in the face of climate change. Make no mistake: climate change is here now—we are living with it as more powerful hurricanes, worsening drought, melting glaciers and rising sea levels are affecting populations around the world at an ever faster pace. While nations have now stepped up to reduce greenhouse gas emissions under the Paris Accord, the new UN requested report makes it abundantly clear

that we must do more.

The report, drafted in response to a request by the United Nations Framework Convention on Climate Change (UNFCCC), evaluates the differences between a 1.5°C and a 2°C future and whether different emissions trajectories can achieve a future with less warming. It makes clear that we need a global commitment to move away from fossil fuels and also focus on the removal of carbon dioxide that is already in the atmosphere (not just reduction of future emissions) to prevent irreversible effects that would have devastating

consequences across the globe. Such an approach is especially vital to the ocean, where achieving a 2°C future (the official goal of the Paris Accord) would still result in destructive changes to the ocean and coastal areas around the world. We can and must do better.

To date, human activities have caused approximately 1°C of global warming since the Industrial Revolution; this warming will likely reach 1.5°C between 2030 and 2052 if current activities continue. While these differences seem small, the consequences are not. Scientists now predict large differences



The image shows the cover of the IPCC Special Report on the Impacts of Global Warming of 1.5°C. The cover features a vibrant, abstract graphic with a yellow and orange top section transitioning into a blue and purple bottom section, with a white wavy line separating them. The IPCC logo and the text 'INTERGOVERNMENTAL PANEL ON climate change' are visible in the top right corner, along with the WHO and UNEP logos. The title 'Global Warming of 1.5 °C' is prominently displayed in white text on a dark blue background. Below the title, a short summary of the report's focus is provided.

ipcc
INTERGOVERNMENTAL PANEL ON climate change

WHO UNEP

Global Warming of 1.5 °C

An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

Visit <https://www.ipcc.ch/sr15/> for the full IPCC Special Report, which includes a summary for policymakers.

between current conditions and those likely to occur between 1.5°C and 2°C. By 2100, average global sea level rise would be around 0.1 meter lower with global warming of 1.5°C compared to 2°C. This seemingly small difference means that up to 10 million fewer people would be exposed to the related risks of flooding, storm damage and coastal displacement. This is especially relevant for the millions of people living on small islands and in low-lying coastal areas and deltas.

For the ocean, the risks are also projected to be substantially lower at 1.5°C than at 2°C. Most striking, coral reefs suffer a 70–90% loss at 1.5°C, but are entirely destroyed at 2°C. Studies have shown that, at the lower loss level, with continued decreased temperatures, corals can still recover. The risk of irreversible loss of many other marine and coastal ecosystems increases sharply with rate of warming, and becomes especially stark at 2°C or more.

Risks to marine biodiversity, fisheries, ocean ecosystems, and the vital functions and services they provide to humans, also increase substantially at 2°C. Should we fail to secure a 1.5°C future,

acidification and warming are predicted to act synergistically—producing stronger effects working together than they could alone—to decrease the growth, development, calcification, survival and abundance of a broad range of species, from algae to fish. For example, at 2°C, loss of global annual catch for marine fisheries would be twice that predicted under a 1.5 °C world. These types of differences would be catastrophic for both the ocean and people alike.

We shouldn't be afraid of this truth. We should confront it head on and let this new climate reality be a motivator to work together to secure the future we want.

The IPCC report was a massive undertaking, comprising three years of work by more than 130 authors, synthesizing over 6,000 scientific references and fielding over 42,000 comments during the extensive peer review process. The report is also a global testament to the importance of research, observations, modeling, synthesis, review and analysis and to the numerous scientists around the world who have donated their time

to summarize this information for the benefit of all of us.

While the ocean is often cast simply as a victim of climate change and a bystander in our climate future, it can, in fact, be an active and important part of our climate solutions as well. Blue carbon habitats sequester large amounts of carbon, making their protection and restoration important parts of a global greenhouse gas reduction strategy. The ocean itself is an important site for the expansion of renewable energy, enabling the ocean to play a role in the clean energy transition. Protection of ocean habitats and marine species through networks of marine protected areas, sustainable fisheries management and pollution reduction are critical strategies to adapt to the changes that will still manifest even under a 1.5°C future. As global citizens, what are our options to ensure a more stable future? The IPCC report explores a range of emissions scenarios that would put the planet on a path to 1.5°C, and we need decision-makers to prioritize those options to ensure a reality.

Enhanced climate ambition is vitally

needed at the international level. Carbon dioxide is raising average global temperature and driving acidification of the ocean. As the UN Framework Convention on Climate Change grapples with the urgency of the findings in this report, we must set global emissions targets that incorporate the needs of the ocean as well as the critical role that the ocean can play in meeting those targets. It's up to each and everyone one of us to take individual action by urging decision-makers across the world to take immediate action. We need to reduce fossil fuels and cut carbon emissions—our ocean depends on it.

Source:

Leonard, G. (2018, October 11). Climate Change and the Ocean: A Stark Message from the IPCC. Retrieved from <https://oceanconservancy.org/blog/2018/10/11/climate-change-ocean-stark-message-ipcc/>

MSC announces £1 million Ocean Stewardship Fund

The Marine Stewardship Council (MSC) has announced a £1 million fund and initiative to support small scale fisheries and those in the Global South on their pathway to sustainability. The MSC has been engaged with fisheries in the Global South since its inception and has built up a solid knowledge of the constraints these fisheries face to achieve a sustainable level of performance. The fund will also help create a more sustainable seafood market through research to overcome data and information gaps in fisheries management.

The MSC works closely with the World Economic Forum's Friends for Ocean Action, a group convened by the UN Secretary General's Special Envoy for the Ocean, Peter Thomson, and the Deputy Prime Minister of Sweden, Isabella Lövin, to build, scale-up and fast track practical solutions to the most pressing challenges facing the ocean. Through the leadership and engagement of its partners, the MSC aims to engage 20% of global fisheries in its programme by 2020, which recognises and rewards

The fund will support fisheries on their pathway to sustainability and invest in new scientific research.

sustainable fishing practices. By 2030 it aims to have engaged over a third of global fisheries. This is aligned with Sustainable Development Goal 14 (SDG14): to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Rupert Howes, Chief Executive of the Marine Stewardship Council, said "Achieving this target will require strategic engagement with fisheries in the global south. These fisheries contribute over 70% of global seafood production. Many are data poor and not operating at a level to achieve MSC certification. The Marine Stewardship Council's £1 million Ocean Stewardship Fund is specifically targeted at helping these fisheries on their pathway to sustainability."

He continued: "The MSC's new Ocean Stewardship Fund builds on the experience and success of our earlier Global Fisheries Sustainability Fund which invested in small scale fishery improvements in a diverse range of eco-systems from the Coral Triangle to the oceans around Madagascar and Suriname. We have substantially increased the scale of the fund and will target investment to those fisheries engaged in a formal transition programme that will deliver measurable improvements in performance."

Funding will be available to help applicant fisheries overcome obstacles to sustainability, to build capacity, knowledge, and address specific data needs identified through a formal MSC pre-assessment. Improvements delivered will contribute to meeting SDG 14.2, 14.4 and 14.7 – sustainably manage marine ecosystems, effectively regulate harvesting and end overfishing.

The initiative has been welcomed by ocean leaders.

Peter Thomson, the UN Secretary General's Special Envoy for the Ocean and Co-Chair of the Friends of

Ocean Action, said: "Our ocean is in trouble. We urgently need to scale workable solutions to deliver sustainable fisheries and resilient marine ecosystems. The attainment of SDG14's targets is essential to the ocean's future well-being. I welcome MSC's latest initiative to engage with and help fisheries in the global south, and to invest in new scientific research that could benefit many fisheries around the world."

Isabella Lövin, Deputy Prime Minister of Sweden and Co-Chair of the Friends of Ocean Action, said: "More than three billion people depend on the oceans as a source of animal protein and marine fisheries directly or indirectly employ hundreds of millions of people, most of them in small scale fishing. Saving our ocean and the life below water is a matter of survival. I welcome MSC's voluntary commitment and engagement in supporting sustainable fisheries in the global south and hope that this fund can contribute to deliver measurable improvements."

Detailed planning of the governance and application

arrangements for the fund are underway, and full details will be announced in early 2019. The MSC will grow the fund over time with contributions from foundations, businesses and individuals who share the organisation's vision of healthy and productive oceans where seafood supplies are safeguarded for this and future generations.

Source:

Marine Stewardship Council. (2018, October 29). Retrieved from <https://www.msc.org/media-centre/press-releases/msc-announces-1-million-ocean-stewardship-fund> ↗

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SANCOR Student Workshop in KZN

The SANCOR KwaZulu-Natal Regional Student Workshop was held on 9 October 2018 at the Sea World Education Centre, uShaka Marine World in Durban. The programme was hosted by SANCOR KZN Representative, Dr David Glassom and SANCOR Student Representative, Ms Sinegugu Mbense. The meeting was themed: "Diving deeper: How to build a career in marine science" and was held in support of capacity building activities and aimed to provide students with the opportunity to meet and interact with each other, showcase their research and learn more about building a career in marine science. The morning sessions comprised of student

presentations while the afternoon consisted of a career session which provided sound advice from accomplished and diverse scientists from various backgrounds in academia, consulting and multi-disciplinary research. Speakers included: Dr Deborah Vivienne Robertson-Andersson (UKZN), Dr Tshoanelo Miya (UKZN), Ms Catherine Meyer (Coastwise Consulting) and Dr Ntuthuko Masikane (University of Zululand), Dr Hafizah Chenia (UKZN). This workshop provided a platform to provide career advice and encouraged a frank discussion on the highlights and challenges of embarking on postgraduate studies and how to overcome obstacles. ✂



Participants at the KZN SANCOR Student Workshop.

Major funding call for ocean sustainability research

*Pre-
Registration Closes
31 January 2019*

Belmont Forum, Future Earth, and the Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans), announce a call for proposals which aim to bring together researchers and experts across the globe to innovate solutions that accelerate sustainable use of oceans and minimize the effects from global change. [Click here for details.](#)

Western Cape Regional Conference of the Marine and Coastal Educators Network

The Marine and Coastal Educators Network (MCEN) is a group of SANCOR that aims to promote awareness and education on the marine and coastal environment and bring together formal and informal educators from schools, public aquariums, non-profit organisations and government agencies. These conferences serve to educate, inform and inspire educators. The Western Cape group chaired by Dr Eleanor Yeld Hutchings, held a regional conference on 27 October 2018 at the Save our Seas Foundation Shark Education Centre in Kalk Bay. The Keynote Speaker, Emeritus Prof George Branch (UCT) provided a synopsis of his latest book "Living shores" which examines the different marine ecosystems and how we interact with them. Anton Fortuin from the Centre for Conservation Education, lead a rocky shore survey at Dalebrook tidal pool and demonstrated the Schoolyard Longterm Monitoring Programme - an in-depth environmental science outreach and a monitoring programme which is designed to provide students and educators with the opportunity to experience the scientific process firsthand. Ruben Hazelzet from the SoapboxSA-Behavioural Design Agency informed the group about the latest school and public campaign, the Captain Fanplastic programme which uses

graphic storytelling, creativity and gamification to educate kids about recycling plastic. Aaniyah Omardien introduced the Beach Co-op which contributes to the understanding of beach and marine litter at the national level and help provide a robust rationale for national campaigns. Lisa Beasley presented on the Cape Town Tidal Pool Projects. Shark Spotters Research Manager, Tammy Engelbrecht described apex predator dynamics in coastal ecosystems and Marco Worship from the Department of Environmental Affairs gave an insightful look into the role of marine technicians and their



Exploring the rocky shores of Kalk Bay with Prof George Branch.

contribution to research. The conference programme consisted of informative and inspirational presentations and provided a stimulating opportunity for learning and networking. ☸



MCEN Western Cape Regional Conference held in October 2018.

Top-down or bottom-up: how is the research agenda shaped in South Africa?

The SANCOR Forum Meeting was held on 10 October 2018 at the Sea World Education Centre, uShaka Marine World in Durban. This annual panel discussion is centred around a topical theme to inform researchers and students on current and relevant issues. The topic this year was "Top-down or bottom-up: how is the research agenda shaped in South Africa?" Speakers included: Prof Sophie von der Heyden (SANCOR Forum and Steering Committee Chair), Dr Gilbert Siko from the Department of Science and Technology (DST), Ms Tracy Klarenbeek from the National Research Foundation (NRF) and Prof Guy Midgley from Stellenbosch University.

Using the Marine and Antarctic Research Strategy (MARS) as an example, Dr Siko discussed the multiple factors which influenced the research agenda, such as national policies, legislative frameworks, research community input and international agreements, etc. MARS was initiated top-down; constructed bottom-up and finalised top-down. Ms Klarenbeek described how the NRF, as one of the implementation

agencies of DST, designs interventions and funding instruments based on the implementation plan of DST, considering government priorities and consultation with the research community. Dr Midgley explained how a growing investment in research and development, or education increases the growth rate of an economy. He also demonstrated how a country's success was directly linked to the extent of its internationalization and collaboration activities. Prof Midgley proposed that a research agenda was shaped according to three aspects:

- 1) Concern on various issues and priorities (by government or regulators),
- 2) Curiosity from scientists leading to knowledge generation and
- 3) Commerce - the use of knowledge and its application in business, resulting in the private sector benefitting from government's investment in research.



Dr Gilbert Siko, DST Representative on the SANCOR Steering Committee, explains the processes involved in setting a research agenda.

Prof Midgely also highlighted why current national and global developments make it possible to undertake exciting science.

The presentations were concluded with a panel-audience discussion. Members of the audience raised the following points and issues:

- The role of communities in the decision-making processes should be emphasized as well;
- Education of communities and early childhood education is essential:
 - ◊ Does our school curriculum sufficiently include content on our

local environment and biodiversity?

◇ Is environmental education in schools connecting children to nature?

◇ Public understanding of science is important. However, scientists are measured by publication output and not science communication. Ms Klarenbeek said that there are various ways to conduct science communication using professionals in this field and that there are funds ring-fenced for it.

- While impacts of a research project are required to be planned, the purpose of science is to investigate the unknown and often the impacts are unknown at the start of a project. As seen in the environment, the more diverse an ecosystem, the more resilient it is. In the same way, a diversity of projects build resilience in knowledge generation. Government

priorities are sometimes narrow. Dr Siko said that there are platforms to fund basic research. Other government departments, have more funds available to conduct environmental research.

- How does increased commercialisation affect sustainability and is policy circumvented by business (e.g. Marine Protected Area networks or increased levels of CO₂ emissions). Dr Siko said that the Marine Spatial Plan will regulate the use of South Africa's oceans. Prof Midgley

indicated that businesses have to report on emissions and pay a carbon tax.

The presentations comprehensively described the processes involved in shaping the current national Marine and Antarctic Research Strategy and its role in shaping international collaborations since then and into the future. This gave participants, an overview of the processes involved in the decision and implementation process in setting a national research agenda. ∅



Participants at the SANCOR Forum in Durban.

Student & Training Opportunities

Opportunity	Closing date
Are you attending: Future Oceans2 the 2nd IMBeR Open Science Conference , Brest, France, 17-21 June 2019. Abstracts close 1 Dec 2018. The Journal of Marine Science and Engineering has just announced their Travel Awards for 2019 . Opportunities for PhD students and postdocs to fund conference travel.	12/31/2018
MSc research opportunity to study the benthic biodiversity patterns around the Falkland Islands.	1/6/2019
2 x PhD opportunities in conservation genomics and climate change Two NRF funded PhD positions are available in the lab of Prof. Sophie von der Heyden lab in the newly funded "Project SeaStore: integrated research to support seagrass restoration and to build estuarine resilience in South Africa", that combines transcriptomic and functional diversity in natural and experimental populations of the seagrass, <i>Zostera capensis</i> , throughout its range. No closing date. Start early 2019.	1/7/2019
Exciting postgraduate opportunities considering the intersection of climate change and bioinvasions An opportunity exists for hard-working, self-driven students to join the Marine Lab at Stellenbosch University. We are expanding our research on the implications of climate change for bioinvasions along the South African coast and invite applications for one PhD and one MSc position. Students will be required to start in early 2019. Those interested in applying should contact Dr Tammy Robinson (trobins@sun.ac.za) and are referred to our webpage (http://robinsonlab.weebly.com/) for more information about the positions and the lab. No closing date specified.	1/11/2019
PhD opportunity investigating the potential of environmental DNA (eDNA) for assessing reef fish community structure and for investigating spatial ecology of reef fishes. Application open immediately and will close once a suitable student has been identified. The project will start in early 2019. No specific closing date indicated.	1/11/2019
Bursaries and fellowships available to study Extreme Climatic Events in the Coastal Zone.	1/18/2019
Project: A framework to assess global change in estuaries: past, present and future Several MSc and PhD bursaries area available for this collaborative project. The MSc and PhD projects have an ecology, and/or an ecological modelling theme. They thus relate to producing ecological data, and modelling hydrodynamics, water quality, populations, communities and ecosystems. All students will be engaged in fieldwork.	1/18/2019
Postgraduate opportunities at UKZN: Accelerated Coral Evolution Our research programme at UKZN and the Oceanographic Research institute (ORI) in Durban focuses on 'accelerated' coral evolution to increase the rate and scope of adaptation. We invite applications for four PhD and two MSc projects to investigate aspects of resilience of corals to thermal stress. We are looking for motivated, self-driven students with a keen interest in contributing to understanding of global coral health. Studentships have standard NRF bursaries attached. These are R90 000 per annum for an MSc and R120 000 per annum for a PhD.	1/21/2019
Call for applications: MOSAiC School 2019 Gain shipboard research experience on board the Research Vessel <i>Polarstern</i> during Sep-Oct 2019. The MOSAiC School 2019 will be open to advanced graduate students and PhD students.	1/22/2019
PhD studentships on Diopatra Project Two PhD studentships are available to investigate the environmental impacts, reproduction and life history patterns of a non-indigenous <i>Diopatra</i> species in the Knysna Estuary. The successful candidate will be supervised by Prof. Carol Simon, head of the Simon Polychaete Research Group based in the Department of Botany and Zoology at Stellenbosch University.	1/31/2019
An MSc opportunity is available for a student to assess and map habitat across several different shallow marine and estuarine habitats including sandy patches, algal beds, seagrass beds and reefs in Algoa Bay. The research will investigate shallow-water seascape connectivity and is part of a larger programme assessing multi-habitat use/dependence for juvenile fishes within Algoa Bay. No closing date indicated. Project will start in ealy 2019.	2/28/2019
International Climate Protection Fellowship for young climate experts from developing countries Spend a year working with a host of your choice in Germany on a research-based project you have developed yourself in the field of climate protection and climate-related resource conservation.	3/1/2019
Enter the 6th biennial Best Young Researcher Paper Award to win your registration fee and \$200 USD to attend The International Society for Ecological Modelling Global Conference . Any author, aged 35 or younger, who published a paper in <i>Ecological Modelling</i> in 2017–2019 or has a paper accepted before the deadline is eligible.	3/30/2019
Chick rearing internship The Seabird Chick Rearing internship has been developed to equip you with chick husbandry skills and egg management skills for a career in captive breeding or seabird chick rearing. These 6 months are offered throught out the year. Visit https://sancob.co.za/chick-rearing-internship/ for more information. No closing dates provided.	3/31/2019

Vacancies

Position	Organisation	Location	Closing Date
Environmental Officer Specialised Production: Environmental Impact Assessment (EIA)	DEA Oceans and Coasts	Cape Town	12/24/2018
Environmental Officer Specialized Production: Oil Spills	DEA Oceans and Coasts	Cape Town	12/24/2018
Specialist Scientist: Chemical Oceanography	DEA Oceans and Coasts	Cape Town	12/24/2018
Scientist Production Grade A: Coastal Research	DEA Oceans and Coasts	Cape Town	12/24/2018
Specialist Scientist: Biological Oceanography	DEA Oceans and Coasts	Cape Town	12/24/2018
Marine Research Assistant III	DEA Oceans and Coasts	Cape Town	12/24/2018
Control Scientific Technician Grade A: Physical Oceanography	DEA Oceans and Coasts	Cape Town	12/24/2018
Control Environmental Officer Grade A: Estuaries Management	DEA Oceans and Coasts	Cape Town	12/24/2018
Environmental Officer Specialized Production: Dumping	DEA Oceans and Coasts	Cape Town	12/24/2018
Environmental Officer Specialized Production: Effluent Disposal	DEA Oceans and Coasts	Cape Town	12/24/2018
Control Environmental Officer Grade A: Effluent Disposal Norms and Standards	DEA Oceans and Coasts	Cape Town	12/24/2018
Marine Project Manager	Blue Ventures	Anjouan, Comoros	12/31/2018
Fishery and aquaculture information management specialist	FAO	Rome, Italy	1/1/2019
Postdoctoral fellowship: model variability and change in the Seychelles-Chagos Thermocline Ridge and tropical Indian Ocean	UCT and SAEON	Cape Town	1/8/2019
National Lead for Monitoring, Evaluation and Learning	Blue Ventures	Antananarivo, Madagascar	1/10/2019
Assistant Scientist	ORI	Durban	1/31/2019
Raman Postdoctoral Program (candidates can apply any time during the year)	Indian Institute of Science	Bangalore, India	3/18/2019

Upcoming Events

Conference	Date	Location
14th Aquaculture Association of Southern Africa Conference 2019	8 - 14 Sep 2019	Stellenbosch
Fourth Xiamen Symposium on Marine Environmental Sciences (XMAS-IV)	6 - 9 Jan 2019	Xiamen, China
ICFA 2019: 21st International Conference on Fisheries and Aquaculture	17 - 18 Jan 2019	Rome, Italy
The South African Integrated Coastal Management Lekgotla 2019	6 – 8 Feb 2019	Cape Town
SOLAS Open Science Conference	21 – 25 Apr 2019	Sapporo, Japan
5th World Congress on Risk: Development and Resilience	6 – 8 May 2019	Cape Town, South Africa
GODAE OceanView Symposium, OceanPredict '19	6 -10 May 2018	Halifax, Canada
50th Annual IAAAM Meeting and Conference for the International Association For Aquatic Animal Medicine	18 – 22 May 2019	Durban
2019 IMBER Open Science Conference	17 – 21 Jun 2019	Brest, France
Southern African Marine Linefish Symposium	8 – 11 Jul 2019	East London
ICTP-CLIVAR Summer School on Eastern Boundary Upwelling Systems: Assessing and understanding their changes and predicting their future	15 - 21 July 2019	Trieste, Italy
Species on the Move 2019: International Conference Series	22 – 26 Jul 2019	Kruger National Park
13th International Symposium on Antarctic Earth Science	22 - 26 Jul 2019	Incheon, South Korea
13th International Conference on Paleoceanography	1 – 6 Sep 2019	Sydney, Australia
IOC-UNESCO Global Ocean Oxygen Network (GO2NE) Summer School	2 – 8 Sep 2019	China
14th Aquaculture Association of Southern Africa Conference 2019	8 – 14 Sep 2019	Stellenbosch
5th Southern African Shark & Ray Symposium	9 – 11 Sep 2019	Cape Town
OceanObs'19	16 – 20 Sep 2019	Hawaii, USA
The International Society for Ecological Modelling Global Conference 2019	1 - 5 Oct 2019	Salzburg, Austria
14th International Conference on Copepoda	14 - 19 June 2020	Kruger National Park

Current Research Funding Opportunities

NRF/DFG Partnership on International Research Training Groups

The NRF has entered into a new partnership agreement with the DFG of Germany to jointly fund [International Research Training Groups](#) (IRTGs) between the two countries. IRTGs are structured Doctoral Programmes aimed at training scientists and academics at different stages of their careers, with a particular emphasis on doctoral researchers. IRTGs promote systematic research cooperation through joint research and qualification programmes as well as through cooperative cross-border supervision of doctoral researchers. A central feature of IRTGs is the coordinated and reciprocal research visits by doctoral researchers at the respective partner institutions. Closing date 31 December 2018

OR Tambo Africa Research Chairs Initiative

The NRF in partnership with the Oliver and Adelaide Tambo Foundation, and supported by the International Development Research Centre (IDRC) of Canada, are pleased to announce the [OR Tambo Africa Research Chairs](#) Call for Expressions of Interest by African public research-intensive

universities. It is the intention to establish an initial ten (10) OR Tambo Africa Research Chairs, restricted to 15 countries in the rest of the continent: Ethiopia, Kenya, Uganda, Tanzania, Rwanda, Senegal, Ghana, Cote d'Ivoire, Burkina Faso, Zambia, Zimbabwe, Malawi, Mozambique, Namibia, and Botswana, focused on research priorities (refer to framework and application guideline) identified by each host institution. Please note that South African institutions can work in partnership with African institutions, but are not the primary applicant. Closes 21 February 2019.

NRF One Call for Proposals - Communiqué

During the last two years the National Research Foundation (NRF) has embarked on a processes designed to enhance and simplify the NRF administrative interface with Researchers, Students and Designated Authorities. This has been done by streamlining its application templates and its Call Opening process in line with the forthcoming Research Support Strategies by the Department of Science and Technology (DST) and the NRF. These changes will create more efficiency in receiving and

processing applications and be more effective in prioritising funding to best serve the NRF mandate. As a result the NRF will publish [One Call](#) for applications for funding in February 2019. Closing Date: Thursday, 28 February, 2019.

Pre-Call Announcement NRF-Nuffic Doctoral Scholarships 2019

The two modalities of doctoral training that will be funded are (i) full-time doctoral studies at a Dutch HEI, referred to as the single site mode, and (ii) full-time doctoral studies jointly developed and implemented by a Dutch HEI and a Partner University in South Africa, referred to as the split-site mode and resulting in a joint degree from the partner institutions. [The scholarships](#) are designed for students enrolled in a full-time, four (4)-year doctoral degree in either single or split site mode. Applications can be made on the NRF Online Submission System during the first week of February 2019.

Forthcoming International Joint Research Funding Opportunities 2019

The following [funding opportunities](#) for joint research proposals will all

be published and the NRF Online Submission System will open on the 1st week of February 2019 for submission of joint research proposals. Closing Date: Thursday, 28 March, 2019. South African researchers interested in applying for these opportunities must consult their institutions for internal closing dates.

- NRF/ NSF (USA) Dimensions of Biodiversity Joint Research Call
- BRICS Multilateral Joint Research Call
- NRF/ ERC Mobility Call

- South Africa/ India Joint Research Call
- NRF/ FAPESP (Brazil) Joint Research Call
- South Africa/ Taiwan Joint Research Programme
- Wallonia Brussels Federation (FNRS) Joint Call

Schmidt Ocean Institute invites expression of interest in:

- [Collaborative marine science aboard R/V Falkor](#)

- [Oceanographic technology research and development](#)

- [Advancing coral reef ecosystem resilience](#)

Further details and submission guidelines are available at <https://schmidtocean.org/apply/apply-for-support/>. Submissions will be accepted through December 28, 2018, via email or the online submission form. Should you have any questions about the SOI Expression of Interest proposal guidelines, criteria, or process, kindly email your question to proposals@schmidtocean.org ✉

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Science in the
Marine and Coastal Environments**

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