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Nelson Mandela University Ocean Science Campus

Opportunities for Post-Graduate Studies in Marine Science 2019

NELSON MANDELA
UNIVERSITY



In association with



**National
Oceanography Centre**
NATURAL ENVIRONMENT RESEARCH COUNCIL



Opportunities to study ocean science are now available starting in April 2018 at the *Ocean Science Campus* (OSC) located at the Nelson Mandela University in Port Elizabeth, South Africa. The regional facility embraces state-of-the-art physical oceanography work spaces, laboratories, post graduate offices, board and lecture rooms, experimental aquaria and a scientific diving and training centre — all of which support a range of disciplines including ocean physics, biogeochemistry, phytoplankton, zooplankton, trophic assemblages and ecology, and fisheries across estuaries, coastal, shelf and deep ocean waters. The OSC is a post graduate facility specialising in the impacts of climate change on western Indian Ocean (WIO) marine ecosystems. It is strongly allied with the *International Indian Ocean Expedition 2 (IIOE2)* (<http://www.iioe-2.incois.gov.in/>) initiative and the Sustained Indian Ocean Biogeochemistry and Ecosystem Research (SIBER — <http://www.incois.gov.in/portal/siber/index.jsp>). As the OSC is focused on regional research, post graduate students studying for MSc and PhD degrees and Post-Doctoral candidates are placed in international, multidisciplinary teams which explore and model the varying ecosystems of the WIO. This not only broadens their knowledge base in ocean science and linkages but also prepares early career scientists for the working environment where teamwork is essential to study large, complex earth systems. Ship-based and robotic sampling forms a key component of all research projects. Research and outputs are strongly aligned with food security and science to governance.



We are offering two study positions as part of a largescale, 4-year international project (2018-21) which investigates ecosystem functioning in the domains of the East African Coastal Current (Kenya and Tanzania) and the Agulhas Bank (South Africa), with reference to climate change and food security. Referred to as SOLSTICE-WIO (*Sustainable Oceans, Livelihoods and food Security Through Increased Capacity in Ecosystem research in the Western Indian Ocean* — <http://solstice-wio.org/>), the project aims to also

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build research capability in the WIO and hence student training and early career advancement is of great importance. Funding for SOLSTICE is provided by the UK Global Challenge Research Fund (GCRF) with scientific expertise from the National Oceanography Centre in Southampton and the university of Southampton, United Kingdom.

The chosen Post Graduate students will be based at the OSC but will also be required to travel to the National Oceanography Centre (NOC) in Southampton (UK) for training and co-supervision during their study period, and therefore must meet UK visa criteria. These visits will provide exposure to international standards for research. They will be part of a transdisciplinary team based between these institutes and will need to work as part of the SOLSTICE team. Students must be highly motivated and determined to succeed as the SOLSTICE team will depend on their results which will be published in peer-reviewed international journals. Scholarships from the Nelson Mandela University will be provided for the duration of study (2 or 3 years maximum).

Closing date for applications: 15 March 2019

SOLSTICE Projects and positions

The South African component of SOLSTICE, led by the Nelson Mandela University, is focused on the collapse of the squid fishery in 2013-14, and the underlying ecosystem shifts that might have been responsible. The study encompasses physical and biological oceanography (incl. biogeochemistry) as well as socio-economic aspects of the collapse of squid fishery.

The following are offered as of March-April 2019.

Trophodynamics – Prey selectivity of squid paralarvae: Latest research shows that fish larvae do not simply capture any zooplankton that readily comes within their reach. Rather, they seem to be genetically coded to prey on specific species for food. This has huge ramifications for fisheries recruitment in that high zooplankton abundance does not necessarily imply larval survival, and good recruitment. Within SOLSTICE, this project will look at the spatial distribution and diet of chokka squid *Loligo vulgaris* in relation to the zooplankton community structure on the Agulhas Bank. The paralarval distribution will be investigated using both historical data and new samples collected during a cruise in March 2019. The paralarvae diet will be studied from *in situ* samples using a DNA gut content approach as well as experimentally in aquaria. The molecular part of the study will be done in the UK in collaboration with the University of Southampton while the experimental approach at NMU will require strong skills in aquaculture. Specifics of the prey capture mechanism will be undertaken using high resolution camera systems in these aquaria.

The level of study will be at PhD. The successful student will have a strong knowledge in marine ecology and aquaculture.

Short title: Prey selectivity of squid paralarvae

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Zooplankton dynamics of the eastern and central Agulhas Bank: This project investigates the productivity of zooplankton on the eastern and central Agulhas Bank, and will mostly focus on new ship-collected samples from a cruise in March 2019. Emphasis will be placed on an oceanographic feature called the Cold Ridge, and its importance in the Agulhas Bank ecosystem. The samples will be analysed using a semi-automated instrument known as a Zooscan that makes measurement used by Artificial Intelligence (AI) to recognise taxa. Analysis of these large data will require the use R and/or Matlab software. This work will also involve the use of biochemical tools to extract protein which then is used as a proxy for production on the bank. Together these techniques enable zooplankton composition and productivity to be determined.

The project can be tailored to either a MSc or a PhD level, depending on the requirements of the successful applicant. The student will have strong skills in ecology, marine biology or biological oceanography. Excellent numerical (incl. multivariate analyses) and statistical skills are required. Programming experience in Matlab or R would be a benefit.

Short title: Agulhas Bank Zooplankton

Enquires and Applications

Interested students should electronically submit:

1. CV with university courses and grades
2. A letter of motivation of why you want to do the project
3. Copy of ID/passport

These should be sent to:

Dr Margaux Noyon
Ocean Science Campus
Nelson Mandela University
Email: Margaux.Noyon@mandela.ac.za