



Study opportunities in Zoology: BSc Honours (R60,000), MSc (R90,000) & PhD (R120,000) bursaries available for research at the Department of Zoology, Nelson Mandela Metropolitan University

PROGRAM 1: OCEAN UTILIZATION IN MARINE TOP PREDATORS AT SUB-ANTARCTIC MARION ISLAND

We invite applications from previously disadvantaged South African citizens for the above full-time research scholarships at the Department of Zoology, NMMU. The successful applicants will focus their research on the foraging behaviour and trophic ecology of a range of marine top predators, mostly seabirds, within a SANAP funded research program at Marion Island.

Marine top predators, such as penguins, albatrosses, petrels and seals, have been studied extensively at Marion Island over the past few decades, largely driven by conservation needs of specific species. The majority of this research has been conducted on a species by species basis, and large amounts of data have been collected on diet and foraging distributions over varying time periods. There is a growing recognition of the importance of studying multiple marine top predator species at the ecosystem-level to gain insights into large scale environmental changes. As these top predators generally target areas of high productivity, they have also increasingly been used to identify ecologically important areas for conservation-based spatial planning. This project focuses on diet and foraging distributions within the marine top predator guild at the Prince Edward Islands to allow for the identification of important habitat and to assess long-term changes in prey species inhabiting the marine environment surrounding these islands.

PhD: Spatial foraging segregation and the use of mesoscale features in marine top predators breeding at Marion Island.

The student will make use of a large set of tracking and dietary data that has concurrently been collected from 12 species of marine top predators, including penguins, albatrosses, petrels and seals to investigate resource partitioning and the reliance on mesoscale features across species. Identification of Ecologically and Biologically Significant Areas (EBSAs) around the islands will also be performed through multi-species tracking. The project will require the student to have a good base knowledge of tracking analysis, stable isotope models, mixed effect modelling and habitat predictive models. The student needs a good working understanding of R statistical environment.

MSc: Decadal shifts in the diet of marine top predators at Marion Island as a function of ecosystem level changes

The distribution and subsequent availability of marine predators' prey is highly variable and is linked to fluctuating oceanographic parameters. To fully understand the impacts of climate change on top predators and subsequently their marine environments a long term, multispecies study is vital. Therefore, in this study historical data on the diet of a range of seabirds and seals that have been collected since the early 1980's will be consolidated and compared between species to assess overlap in diet and decadal shift in the diet composition of a range of seabird species. Considering large scale climate related oceanographic changes that have taken place in the Southern Ocean in recent years, the study will aim to assess biological changes in terms of lower level prey taxa that have accompanied these oceanographic changes.

BSc Honours: Comparative dive behaviour of gentoo penguins breeding at two localities around Marion Island

The foraging behaviour of gentoo penguins depends on the marine environment surrounding their colony and the prey available to them. It has been found that if it is not too deep (150-200m) the penguins will dive to the sea floor before they begin searching and capturing prey. At other colonies, where it is not possible to dive to the sea floor they will dive shallower, looking for prey within the water column. The fine scale foraging behaviour of the gentoo penguins at Marion Island has only been studied once before (during 2014) and at only one breeding colony. This recent research showed that these penguins have an unique foraging strategy that may have evolved due to either the close proximity of their foraging area or decreased prey availability at Marion Island. This study will aim to look at the differences in foraging distribution and diving profiles between two colonies at Marion Island that face different marine environments and foraging conditions and it will further explore these penguins' unique foraging strategy. The study will use data already collected through the use of Time Depth Recorder (TDRs) and Global Positioning System (GPS) tracking instruments.

NOTE: A number of further potential honours projects within the theme of this program exist and are open to all applicants.

PROGRAM 2: DEMOGRAPHY AND BEHAVIOUR OF CAPE GANNETS AT BIRD ISLAND

MSc: Individual specialisation in Cape gannets breeding at Bird Island, Algoa Bay

MSc: The breeding range of Cape Gannets is restricted to southern Africa, and is limited to six offshore islands. Currently the only colony that is increasing in numbers is the easternmost colony at Bird Island, Algoa Bay, which currently supports some 90,000 breeding pairs, making it the largest gannetry in the world. This colony now makes up the bulk of the species numbers and changes in this population largely impacts on the conservation status of Cape Gannets, currently listed as 'Vulnerable' according to IUCN criteria (Birdlife International 2010).

With food availability probably being the most important factor influencing population growth in Cape Gannets, this project will study individual strategies and specialisation in gannets in terms of finding prey resources. Individual consistency in foraging behaviour will be assessed through the use of GPS loggers and VHF based monitoring data on Time Activity Budgets. The successful applicant will be expected to spend several weeks on Bird Island each year collecting tracking data which will be used in addition to historical data that has been collected over the past few years.

Candidates should have an appropriate BSc/BSc Honours/MSc degrees with excellent track records. The successful candidates will form part of the dynamic Marine Apex Predator Research Unit (MAPRU).

The value of the scholarships are R60 000/ R90 000/ R120 000 per year for BSc Honours, MSc and PhD respectively. Renewal each year will be contingent on satisfactory academic progress.

To apply, please send a CV (including your academic record & names and contact details of two referees) and a short motivation letter to Dr Pierre Pistorius at ppistorius@nmmu.ac.za.

For more information on the Marine Apex Predator Research Unit visit <http://mapru.nmmu.ac.za/>

Closing date: Please submit applications as soon as possible but no later than 6 January 2017