The Marine Apex Predator Research Unit

Dr Pierre Pistorius

Nelson Mandela Metropolitan University

for tomorrow

Goals

1. To conduct research on marine top predators, including seabirds, seals, sharks and cetaceans particularly in relation to global change, conservation and sustainable resource management.

2. To provide learning opportunities and train post-graduate students in various aspects involving marine top predators.

3. To be involved in various forms of engagement, using charismatic predator species to stimulate public interest in marine biodiversity and conservation.

Members

8 Staff, contract and research associates

6 Post-docs

15 Post-graduate students

PhD

Rabi'a Ryklief
"Gannets in contrasting environments: behaviour, demographics and indicators of environmental change"

Sibusisiwe Tele (Ngqulana)
“The taxonomic status of dolphins Tursiops spp. and Delphinus spp. in South African waters”

Gwendoline Traisnel
"African penguin phenotypic plasticity during global changes"

Danielle Fife
"Tracking trace elements (including heavy metals) in seabird communities using stable isotopes and fatty acids"

Tegan Carpenter-Kling
“Marine top predator distribution and diet at the Sub-Antarctic Prince Edward Islands”

PhD

Jonathan Handley
“Gentoo penguin foraging ecology at the Falkland Islands”

Dr Alejandra Vargas Fonseca
“Abundance, distribution and population genetic structure of Indo-Pacific bottlenose dolphins (Tursiops aduncus) along the southeast coast of South Africa”

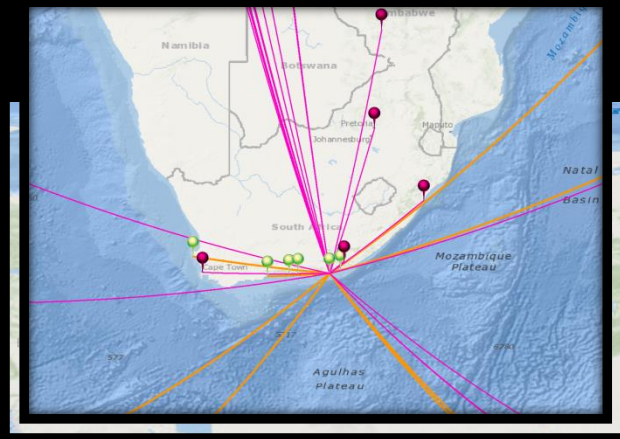
Jonathan Botha
“A regional assessment of foraging and trophic ecology of the Cape fur seal (Arctocephalus pusillus pusillus)”

MSc

Makabongwe Sigqala
“Decadal shifts in marine top predators on Marion Island”

Danielle Van Den Heever
“Foraging ecology of Wedge-tailed Shearwaters (Puffinus pacificus) breeding in two islands in the tropical western Indian Ocean: Seychelles and la Réunion”

Kuhle Hlati
“Assessing spatio-temporal patterns of cetacean occurrence in the south-east coast of South Africa, using synchronised automated acoustic and visual monitoring systems”



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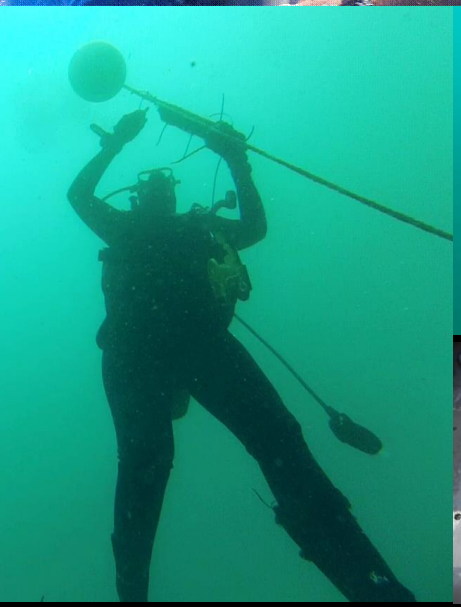
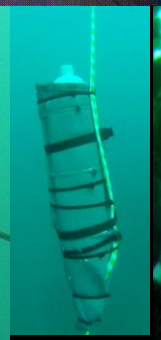
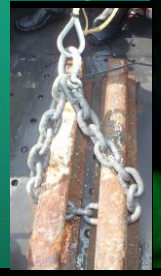
Nelson Mandela Metropolitan University

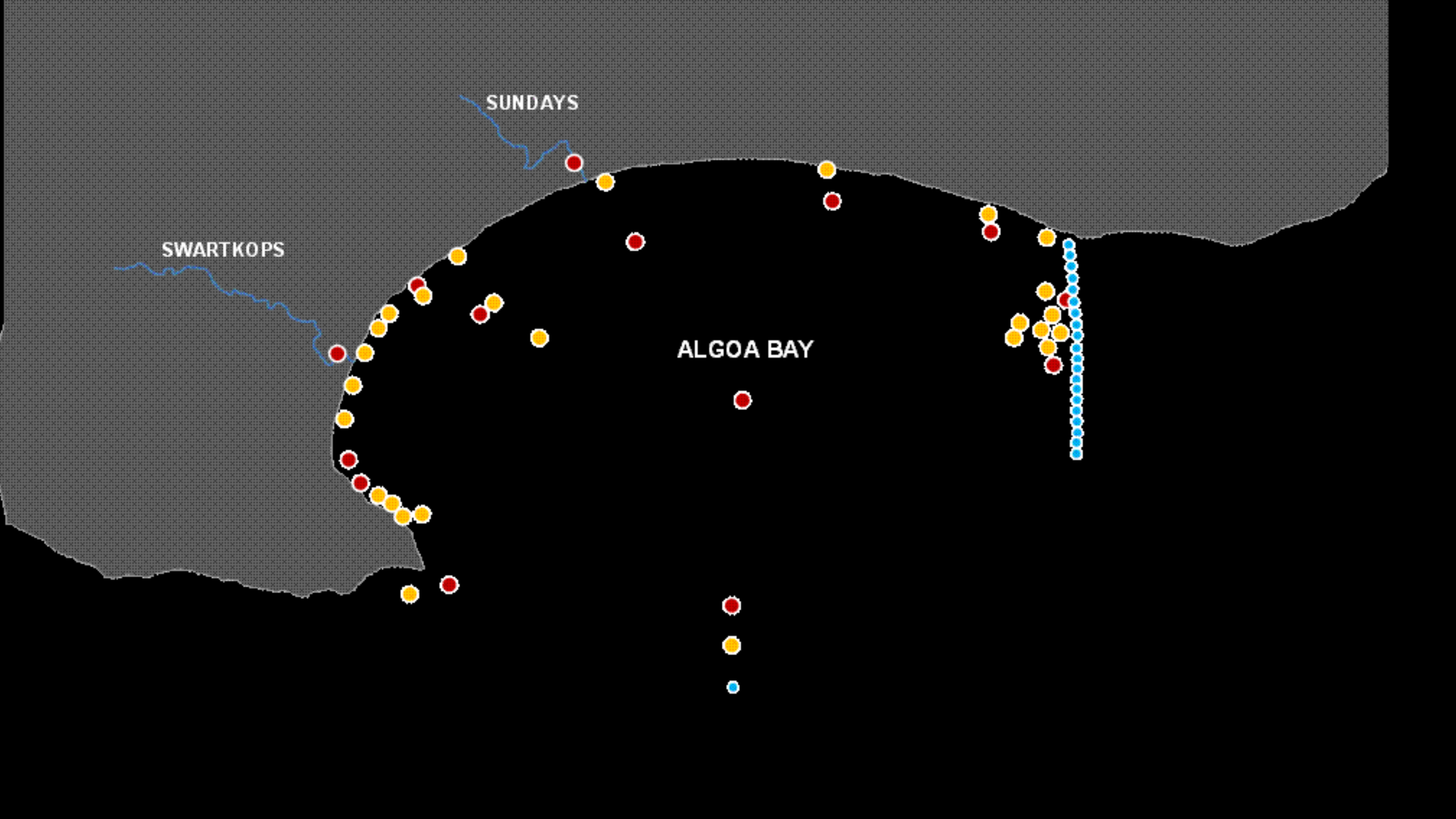
for tomorrow

Marine Apex Predator Research Unit








SUNDAYS
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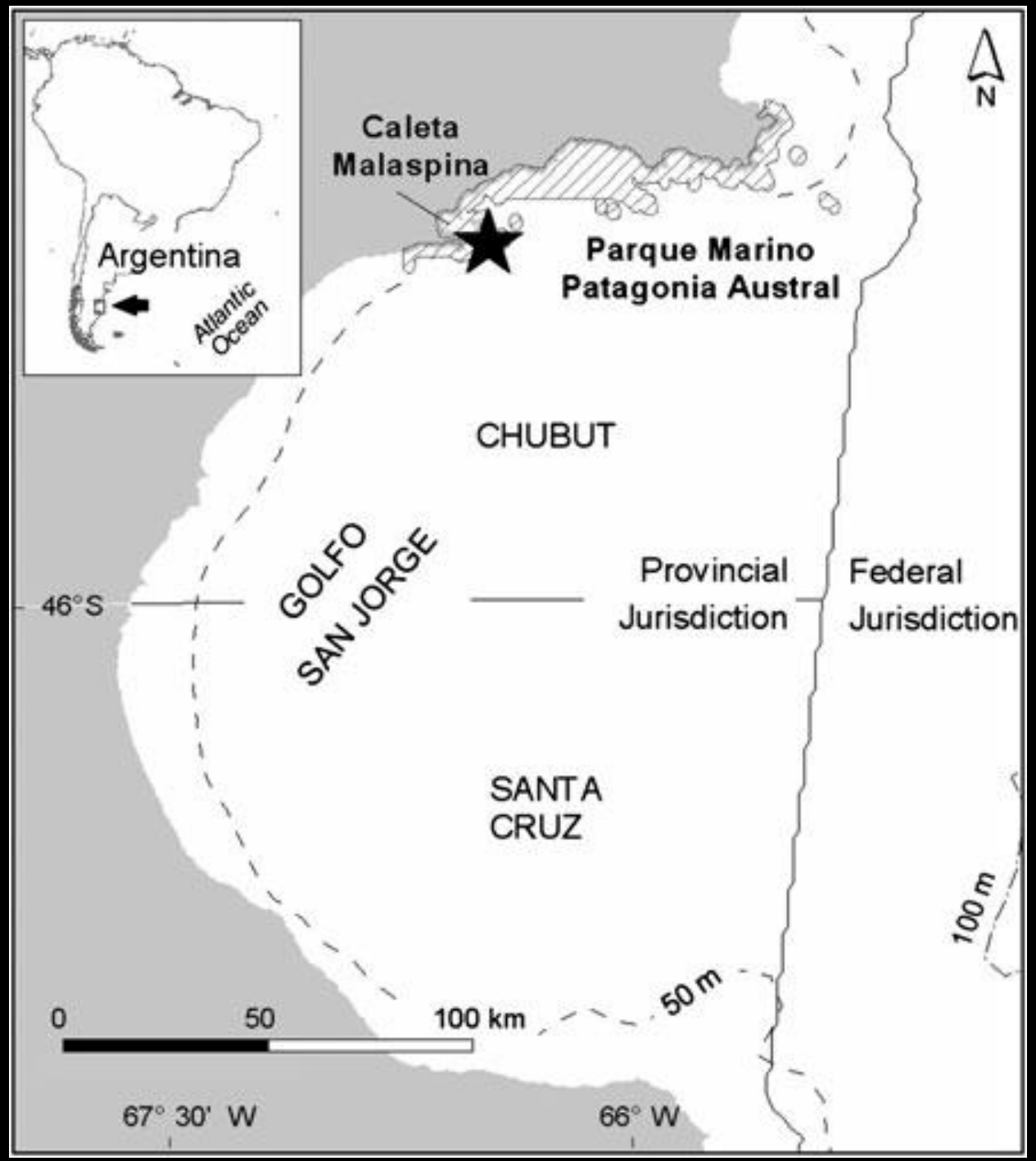
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Publications

- 2016 21

Publication: Herald (Morning Final)
Date: 21 Jun 2016
Page: 3

NMMU graduate uncovers epic penguin trips

UNIQUE RESEARCH: NMMU's Tegan Carpenter- Kling approaches an albatross on Marion Island Picture: JOHN DICKENS

Herald Reporter

KING penguins off the sub-Antarctic Marion Island make epic trips to find food for their young, some swimming 2 000km from the island, crossing from the Indian Ocean into the Atlantic, and lasting as long as four weeks.

This was among the findings of a year's research at Marion Island by NMMU zoology master's graduate Tegan Carpenter-Kling, who returned to South Africa last month on the country's newest research vessel, the Agulhas II.

The research conducted by Carpenter-Kling forms part of a large-scale project under the South African National Antarctic Programme (SANAP), of which NMMU's Dr Pierre Pistorius is the principal investigator.

The data she collected, which will form part of her doctoral studies, is unique in that she studied the foraging behaviour of 12 of Marion Island's top-predator surface-breeding species.

"I was trying to simultaneously track all 12 species to be able to identify areas of ecological or biological importance," she said.

Carpenter-Kling also discovered new foraging behaviour for Gentoo penguins – which alternate between short foraging trips, to feed themselves, and longer ones, to find food for their young.

She also recorded the deepest dive yet for a Gentoo penguin, which was over 200m.

The broader project, which is a collaboration between NMMU, the Department of Environmental Affairs and the universities of Cape Town and Pretoria, involves mapping areas of conservation importance around the island and monitoring the impact of climate change and other factors on the various species.

Carpenter-Kling was part of the annual "over-wintering" team – she spent 13 months on the island with about 20 others.

To gather her data, she needed to fit GPS devices and depth recorders onto two species of fur seals, four species of penguins, four species of albatrosses and two species of giant petrels.

This was a difficult task which required walking long distances.

"Fortunately, the other researchers helped me with this, as it is quite dangerous," she said.

NMMU postgraduate Jess Berndt has replaced Carpenter-Kling to over-winter on Marion Island until the Agulhas II returns in a year's time.

Publication: Burger (Oos Kaap), Saterdag
Date: 27 Feb 2016
Page: 8

NAVORSING VERRAS EKOLOË

Pikkewyne is 'koskleptomane'

Port Elizabeth. – Hulle lyk dalk oulik, selfs weerloos as hulle in hul "aandpakke" rondwaggel, maar in diepe waters draai daar 'n bakleierige pikkewyn rond.

Seldsame video-opnames het gewys hoe witoorpikkewyne, sterk swemmers en jagters, onder die waters van die Falklandeilande kos met geweld uit mekaar se bekke steel.

Inligting oor dié verskynsel is einde verlede jaar op internasionale vlak gepubliseer deur Jonathan Handley, 'n doktorsgraadstudent aan die Nelson Mandela Metropolitaanse Universiteit (NMMU).

"Dit is nuwe gedrag – nie net vir witoorpikkewyne nie, maar ander spesies pikkewyne ook," het Handley, verbonde aan NMMU se eenheid vir marieneroofdier-navorsing, gesê.

Handley se navorsing is in die joernaal *Polar Biology* gepubliseer.

Hy het drie broeiseisoene lank pikkewyne op die Falkland-eilande bestudeer. "Ons wil weet watter faktore sekere sub-bevolkings op die eilande beïnvloed, want dit sal ons help om te verstaan hoe dié diere sal aanpas tot wêreldwye veranderings."

Handley het verlede jaar agt videokameras aan pikkewyne vasgemaak, waaruit hy die opname van drie pikkewyne se bakleiery oor kos gekry het.

Dié opname is "die mees dramatiese opname wat tot dusver gesien is" oor pikkewyne se onderwaterbedrywighede, het dr. Norman Ratcliffe, 'n seëvoeleko-loog van die British Antarctic Survey in Cambridge, Engeland, gesê. "Kleptoparasitisme, of dié soort diefstal, is al by ander spesies soos seemeeue opgemerk, maar dié video is uniek, want die gedrag sou nie gesien kon word sonder hedendaagse tegnologie nie. Voortdurende gebruik van dié tegnologie sal sonder twyfel nóg meer insig oor die pikkewyne se ekologie bied."

■ **Kyk na Handley se video by https://www.youtube.com/watch?v=i4OIlVGANyM**

Jonathan Handley en 'n helper maak 'n videokamera aan 'n pikkewyn vas. Foto: VERSKAF

Penguins' secret dark side shown

They may be dressed for dinner but lack manners, footage reveals

ZOOMING IN: Jonathan Handley attaches a camera to a gentoo penguin, assisted by Alicky Davey, a Briton working with Falklands Conservation on a habitat restoration project

THEIR tuxedo markings and awkward waddle-walk – along with movies like *Happy Feet* – have boosted the "cuteness" stakes for penguins. But below the waves, that all changes.

In addition to their being stealthy swimmers and keen hunters, unique video footage has revealed a dark side.

A video camera attached to the back of a gentoo penguin, swimming off the Falkland Islands captures a violent underwater scuffle where penguins steal food right out of each other's beaks.

"This is completely new behaviour, not just for gentoo penguins but for penguins in general," Jonathan Handley, a doctoral student in the Marine Apex Predator Research Unit at Nelson Mandela Metropolitan University said.

His article on the phenomenon has been published in the international journal *Polar Biology*.

In the video, a penguin catches a large squid, clamping it tightly in his beak.

Before he can gulp it down, a second penguin snatches the squid away. Then a third joins the scuffle.

The first penguin makes a bid for his precious catch, and the squid is torn in two. The third penguin is the victor, escaping with the biggest portion.

"Video cameras on penguins have revealed their underwater interactions with habitats, prey and other penguins but this is the most dramatic footage we've captured," Dr Norman Ratcliffe, a seabird ecologist at British Antarctic Survey in Cambridge, said.

"Kleptoparasitism (the food-stealing behaviour) has been observed in many seabird species [seagulls, in particular], but these images are unique in that they were captured underwater in a situation that would have been unobservable without this technology," Ratcliffe said.

"It is interesting that the interaction was over a squid – a large and difficult-to-capture prey item that is clearly worth fighting for ...

"Continued use of this technology will reveal more about their underwater behaviour that will improve our understanding of their foraging ecology."

Handley studied the Falkland Islands gentoo penguins over three breeding seasons – October to March 2011-12 to 2013-14 – to try to find out how different colonies across the islands prosper.

Publication: Cape Argus (4th Edition)
Date: 13 Jun 2016
Page: 8

Exciting bird-life discovery on Island

Study finds King penguins swim 2 000km to find food for young

Nicky Willemse
SPECIAL CORRESPONDENT

A STUDENT'S year-long study on Marion Island has revealed new penguin behaviour.

King penguins off the sub-Antarctic Marion Island make epic trips to find food for their young, some swimming 2 000km away from the island, crossing from the Indian Ocean into the Atlantic, and lasting as long as four weeks.

This was among the findings of a year's research at the sub-Antarctic Marion Island for Nelson Mandela Metropolitan University zoology master's graduate Tegan Carpenter-Kling, who returned to South Africa last month on board the country's newest research vessel, the Agulhas II.

The research conducted by Carpenter-Kling forms part of a large-scale project under the South African National Antarctic Programme (SANAP), of which NMMU's Dr Pierre Pistorius is the principle investigator.

The data she collected, which will form part of her upcoming doctoral studies, is unique in that she studied the foraging behaviour of 12 of Marion Island's top-predator surface-breeding species (which includes seabirds and seals), rather than just a single species, as most researchers have done in the past.

"I was trying to simultaneously track all 12 species to be able to identify areas of ecological or biological importance," she said.

Besides discovering the epic journey King penguins make, which has not been documented before, Carpenter-Kling also discovered new foraging behaviour for Gentoo penguins – in that they alternate between short foraging trips, to feed themselves, and much longer ones, to find food for their young.

She also recorded the deepest dive yet for a Gentoo penguin, which was more than 200m.

The broader project, which is a collaboration between NMMU, the Department of Environmental Affairs and the University of Cape Town, involves mapping areas of conservation importance around the island, while also monitoring the impact of climate change and other factors on the various species, many of which are a conservation concern due to their declining numbers.

Carpenter-Kling was part of the annual "over-wintering" team: she spent 13 months on Marion Island with a team of about 20 others, several of whom were responsible for the logistical running of the sub-Antarctic research station, while others were doing research under the different SANAP projects.

To gather her data, she needed to fit GPS devices and depth recorders onto the study animals, which included two species of fur seals, four species of penguins, four species of albatrosses and two species of giant petrels – a difficult task considering so many breeding colonies had to be accessed, which required walking long distances.

"Fortunately, the other researchers helped me with this, particularly with the seals, as it is quite dangerous to do this on your own."

It was her second stay on the near-pristine island, which forms part of the Prince Edward Islands – and she is hoping to return again for more research.

RESEARCH: Students have revealed new penguin behaviour after a year-long study off and on Marion Island.

> *"SHE ALSO RECORDED THE DEEPEST DIVE YET FOR THE GENTOO PENGUIN WHICH WAS MORE THAN 200M*

"We want to use the data Tegan has collected to make recommendations on the expansion of the existing Marine Protected Area around the Prince Edward Islands," said Dr Pistorius, who journeyed to the island on the Agulhas II's recent annual five-week research trip, and is supervising Carpenter-Kling's PhD project.

He said the value of her studying so many different species was that they could identify overlaps in the foraging range of the various species, which would help them to identify areas of importance.

Under the SANAP study, Pistorius said NMMU was also compiling the tracking data collected on Marion Island, which started in the 1980s, to contribute towards an international project called the Retrospective Analysis of Antarctic Tracking Data, which will involve a global analysis of tracking data throughout the Antarctic and sub-Antarctic waters.

"We are using all the information to look at habitat use and the response of marine top predators to changing climatic conditions.

"We know climate change is a major influence in the Southern Oceans. The Antarctic Polar Front is an important foraging area.

"The Front is shifting southwards, moving away from Marion Islands – and often the animals have to work harder to get food before returning to their offspring.

The impact of climate change is felt most strongly in the Polar Regions.

"Working together with oceanographers, we are using marine top predators to better understand ecosystem changes in the Southern Ocean."

NMMU postgraduate Jess Berndt has replaced Carpenter-Kling to over-winter on Marion Island until the Agulhas II returns in a year's time. Pistorius said researchers on the latest Agulhas II trip included academics from NMMU, the universities of Cape Town and Pretoria, as well as researchers from the Department of Environmental Affairs.

"Data collected by the ship-based oceanographers is particularly important for us, as we need this information to better understand climate change impacts across all trophic levels."

Marine Apex Predator Research Unit

NEWS

11/03/2016 - Media coverage of penguin kleptoparasitism paper

05/03/2016 - Public talk on killer whales at Bayworld

ABOUT US

The Marine Apex Predator Research Unit (MAPRU) is a research unit at Nelson Mandela Metropolitan University. Our research focuses on marine top predators as a group addressing questions of fundamental and applied interest by drawing on a range of disciplines.

More Info

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