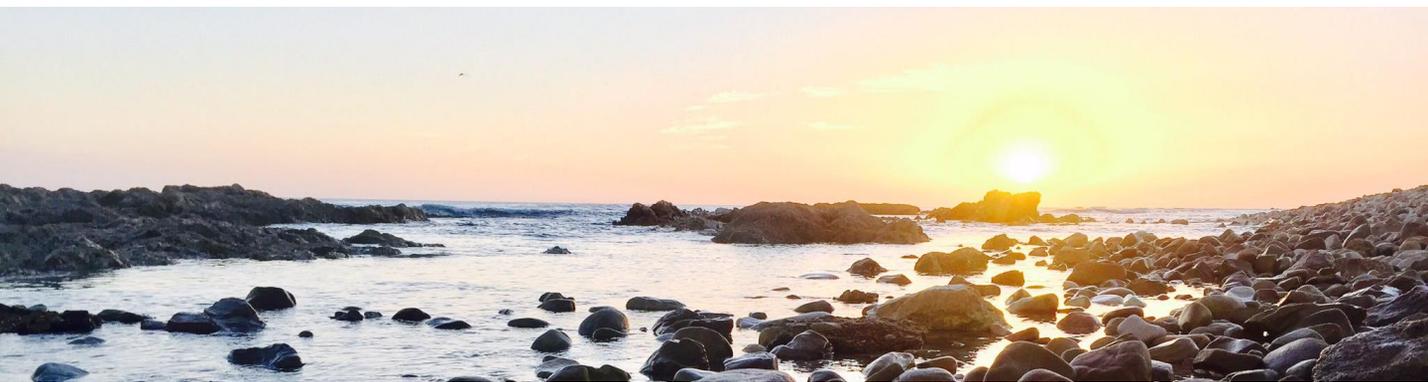


Institute for Coastal and Marine Research
(CMR)
Research Symposium 2018

*Celebrating
Research Associates*

Date: Friday, 16 November 2018
Time: 08:30 – 19:00
Venue: Conference Theatre, North Campus,
Nelson Mandela University



Presentation Abstracts



NELSON MANDELA
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Programme: Morning Sessions

Time	Item
08:30-08:45	Prof. Andrew Leitch (DVC: Research and Engagement) <i>Welcoming Address</i>
08:45-09:45	Dr David Kaplan <i>Plenary Talk – Squaring data and models in larval connectivity studies: Conceptual differences, uncertainties and future challenges.</i>
Session 1: Coastal Interface	
09:45-10:05	Dr Eckart Schumann <i>Sand, floods and the Keurbooms Estuary.</i>
10:05-10:25	Dr Margaux Noyon <i>Mesoscale variability of plankton in three seamounts in the Western Indian Ocean.</i>
10:25-10:45	Prof. Jean Greyling <i>BOATS – A mobile game educating kids about plastics in the ocean.</i>
10:45-10:55	Dr Linda Harris (CMR Biodiversity & Conservation Research Theme Coordinator) <i>Session Discussion and Conclusion</i>

Tea
10:55-11:30

Session 2: Algoa Bay Community of Practice Project

11:30-11:50	Prof. Rosie Dorrington <i>Working together for our oceans: A marine spatial plan for Algoa Bay, South Africa.</i>
11:50-12:10	Ms Bracken van Niekerk <i>Algoa Bay Information Management Systems.</i>
12:10-12:30	Prof. Tommy Bornman <i>Towards an improved understanding of the biogeophysics of Algoa Bay.</i>
12:30-12:50	Dr Shirley Parker-Nance <i>The hard bottom line – not just a collection of images.</i>
12:50-13:00	Dr Shaun Deyzel (CMR Global Change Research Theme Coordinator) <i>Session Discussion & Conclusion</i>

Lunch
13:00-14:00

Programme: Afternoon Sessions

Time	Item
Session 3: Conservation	
14:00-14:20	Dr Lorien Pichegru <i>South African seabirds research and conservation.</i>
14:20-14:40	Dr Maëlle Connan <i>Cape fur seal teeth as a record of historical changes in the southern African marine ecosystem: Information from bulk and compound specific stable isotopes.</i>
14:40-15:00	Dr Greg Hofmeyr <i>The role of dedicated beach surveys in assessing unusual mortality events in marine mammals.</i>
15:00-15:20	Dr Andréa Thiebault <i>Cape gannet at-sea communities.</i>
15:20-15:30	Prof. Pierre Pistorius (CMR Acting Deputy Director) <i>Session Discussion & Conclusion</i>

Tea
15:30-16:00

Session 4: Estuaries	
16:00-16:20	Prof. Guy Bate <i>The effects of rapid population growth and lack of planning on groundwater and coastal lake water quality in Maputoland.</i>
16:20-16:40	Mrs Zanele Hartmann <i>A social-ecological systems approach to integrated estuarine management: Swartkops Estuary.</i>
16:40-17:00	Dr Taryn Riddin <i>Mapping estuarine habitat: past, present and future.</i>
17:00-17:10	Dr Paul-Pierre Steyn (CMR Living Resources & Food Security Research Theme) <i>Session Discussion & Conclusion</i>
17:10-17:30	Dr Bernadette Snow (CMR Acting Director) <i>Closing Address</i>

Cheese & Wine
17:30-19:00

Abstracts



Dr David Kaplan - Plenary Speaker

Squaring data and models in larval connectivity studies: Conceptual differences, uncertainties and future challenges.

Despite major advances in our capacity to measure marine larval connectivity (i.e. the pattern of transport of marine larvae from spawning to settlement sites), with an increasingly diverse and powerful palette of methods (TRIAL, close-kin mark recapture, individually-based transport modelling), and the importance of these measurements for ecological and management questions, uncertainty in and the appropriate interpretation of estimates of marine larval connectivity have not been fully clarified. This presentation will detail three of the numerical and empirical approaches used by Dr Kaplan to look at connectivity and why they may not square up between each other. First, theory is used to understand differences between and assess value for conservation of the different connectivity indices that come out of empirical versus numerical approaches to estimating connectivity. Next, Dr Kaplan assesses how experimental uncertainty in empirical connectivity measures (largely related to small sample size) impacts the confidence in published connectivity measurements. Finally, some results from using trans-generational isotope labelling (TRIAL), close-kin mark-recapture (genetics) and numerical transport modelling to assess self-recruitment of humbug damselfly larvae within the southwest lagoon of New Caledonia, are presented. These measurement approaches do not produce the same result and Dr Kaplan reflects on what processes might explain these differences from superficially equivalent approaches to assessing connectivity.

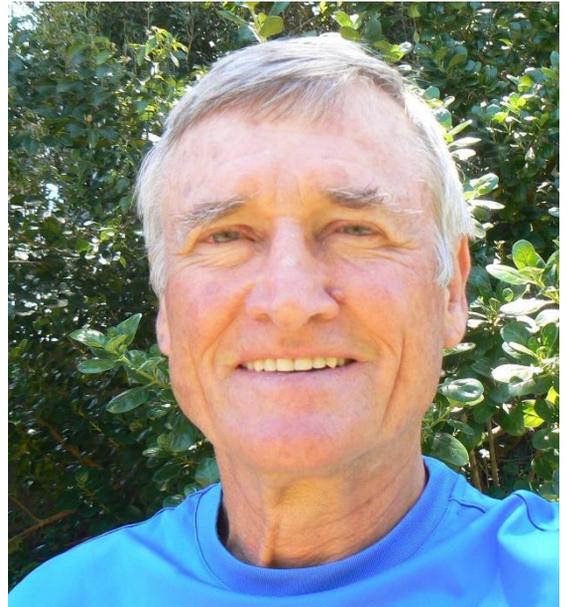
Research Interests

Dr Kaplan obtained his PhD degree in Physics from the University of California in 1997. At present, he is an Associate Researcher at the IRD, France. His research currently focuses on assessing the effects of different forms of spatial and non-spatial fisheries management on marine populations. Using the lenses of meta-population modelling, experimental marine ecology, species distribution modelling, analysis of fisheries catch-effort data and oceanography, he also looks at how marine spatial management relates to sustainability, conservation, and community structure of marine populations with distinct dispersal and reproductive potentials. Recent work has included studies on the implications of offshore marine protected areas for mobile demersal and pelagic species. He also studies the effects of oceanographic processes on temporal and spatial patterns of larval settlement.

Dr Eckart Schumann

Sand, floods and the Keurbooms Estuary.

The Keurbooms Estuary has a narrow lagoon lying inwards of a dune-topped sandy barrier, or barrier dune, almost four kilometres long. The estuary exits to the sea through this barrier dune via a mouth which, at various times, has been positioned along the whole length of the barrier dune. Dr Schumann has been making GPS measurements of the high and low water levels in the sea and estuary since 2006. Over the next seven years there were several flood events, but three large floods in 2006, 2007 and 2012 caused massive changes in the morphology and sedimentation in the estuary. These floods also caused substantial infrastructural damage as well as the loss of amenities – specifically Lookout Beach. Some history will be presented, but the emphasis will be on recent events. The changes will be described, with reasons why the effect of floods depends on the state of the estuary and the ocean at the time.



Dr Margaux Noyon

Mesoscale variability of plankton in three seamounts in the Western Indian Ocean.

Seamounts are present in all ocean basins and represent oases by attracting top predators. In an oligotrophic ocean like the Western Indian Ocean, these seamounts might be even more important for local productivity and connectivity than in other environments. This study is aiming to understand how seamounts may influence plankton abundance and distribution. We sampled three seamounts in the Western Indian Ocean: La Perouse, Mad-Ridge and Walters Shoals, distributed latitudinally at 19°S, 27°S and 33°S. Various trophic levels were sampled from small phytoplankton cells (i.e. picoplankton) to ichthyoplankton. At the exception of ichthyoplankton, we found that concentration of plankton overall did not increase significantly on seamounts. Mesoscale features such as cyclonic eddies and cross-shelf transport had a stronger influence on plankton distribution. Fish larvae, however, showed a higher concentration on top of one of the three seamounts.





Prof. Jean Greyling

BOATS – A mobile game educating kids about plastics in the ocean.

2017 Computer Science Honours student, Byron Batteson, developed the mobile game TANKS, which is aimed at introducing kids to coding. During 2018 it has been proven to be very popular across South Africa, with nearly 2000 kids interacting with it at various workshops. BOATS is a spin-off board game which uses similar coding concepts, but by introducing playing cards, it educates kids about plastics in the ocean. Three different versions of the board game make it accessible over a wide age range. The cards can also be used separately for normal card games. The new two-player BOATS mobile app will be launched at the Symposium, also focusing on plastics in the ocean.



Prof. Rosie Dorrington

Working together for our oceans: A marine spatial plan for Algoa Bay, South Africa.

South Africa's large exclusive economic zone includes the Indian, Atlantic and Southern Oceans. Management of this ocean space has traditionally been undertaken within sectors, leading to conflict amongst sectors, as well as between these sectors and the need for environmental protection. As the demand for ocean space and marine resources increases, in response to a growing oceans economy, a more integrated approach to management is required to ensure that both ecological and socio-economic objectives are met. Marine Spatial Planning (MSP) has emerged in many countries as an effective process to achieve this integration, and in 2016, South Africa became the first African country to draft MSP legislation. This legislation (the MSP Bill and Framework) provides for a multi-stage approach to develop four marine area plans for the South African EEZ: the East Coast, South-East Coast, West Coast and Prince Edward Islands. The first plan will allow the MSP process to be fine-tuned for application in subsequent plans. In 2017, a Communities of Practice grant from the National Research Foundation allowed the Universities of Rhodes, Nelson Mandela and Fort Hare to begin a collaborative case study in Algoa Bay, to pilot marine spatial planning approaches and products. These are designed specifically to feed into the national requirements for the marine area plans. Algoa Bay is considered the best-monitored coastal area in Africa and in the southern hemisphere and is thus an ideal planning region for a case study. Here we report on the progress to date on this case study, also referred to as the Algoa Bay Project.

Ms Bracken van Nickerk

Algoa Bay Information Management Systems.

The Algoa Bay Project has formed a team dedicated to work on the information management systems for the project. The aim of these systems is to provide the tools for archiving and disseminating data and information related to the Algoa Bay Community of Practice. We have a dedicated website and Facebook page for sharing news about the project and latest research highlights. We have compiled an extensive literature database, which is constantly growing. This database contains the key information about published literature related to Algoa Bay. Under development is the projects database, which will contain information about the researchers and students conducting research in the Bay. We have also developed a spatial data repository for archiving and sharing data, documentation and maps using the online platform GeoNode. This tool has been designed to facilitate data sharing and use with the end goal of facilitating data usage in the development of a marine spatial plan for Algoa Bay.



Prof. Tommy Bornman

Towards an improved understanding of the biogeophysics of Algoa Bay.

The biological and physical oceanography of Algoa Bay is very complex and, although it has been intensively studied for several decades, there are still many gaps in our knowledge on the physico-chemical drivers and ecosystem responses. Algoa Bay is uniquely influenced by oceanographic features including warm tropical waters from the Agulhas Current and upwelling of cool, nutrient rich bottom waters. In addition, freshwater is fed into the Bay by rivers and groundwater thereby sustaining unique and productive ecosystems such as estuaries, stromatolites and surf zones. The multi-disciplinary Algoa Bay Community of Practice (CoP) Project seeks to provide a broad overview of the system by integrating existing data on the oceanography (physical, chemical and biological), bathymetry, coastal and marine geology and geomorphology into a fine-scale bioregional plan. The presentation will highlight our current understanding of the environment and identify gaps that require further study.



Dr Shirley Parker-Nance



The hard bottom line – not just a collection of images.

The ocean floor of Algoa Bay includes a number of subtidal reef systems, two of which support island groups. The mosaics of hard substrate and unconsolidated sediment shape the character of the entire system from the bottom to top. Understanding the underlying processes that support the diversity of life, from unicellular organisms to large predators, requires an account of the different benthic communities within this bay. This will contribute significantly to our understanding of processes, system dynamics, and the impact of resource management and use in the face of global change and increasing local anthropogenic impacts.



Dr Lorien Pichegru

South African seabirds research and conservation.

South Africa's marine environment is teeming with charismatic marine top predators, many of them endemic to the region. Several endemic seabird species, such as African penguins, Cape gannets or Cape cormorants, have suffered drastic decline in recent years, resulting in an Endangered status. As a result, most of their population is concentrated on very few breeding spots, making them highly sensitive to local threats and changes in environmental conditions. Here I will present some of the recent local research on their behavioural response to local environmental conditions and to some of the threats weighing on them, such as climate change, competition with fisheries, or predation by other species. I will also expose how effective and successful conservation measures necessitate an active engagement between researchers and the management authorities, as well as with the public.

Dr Maëlle Conman

Cape fur seal teeth as a record of historical changes in the southern African marine ecosystem: Information from bulk and compound specific stable isotopes.

The combined effects of climate change and industrial-scale fishing had an unprecedented impact on marine ecosystems. For example, small pelagic fish inhabiting the west coast of southern Africa collapsed fifty years ago before showing different trends in recovery between the west coast and the south-eastern coast. We combined bulk and specific amino acid carbon and nitrogen stable isotope (SI) values from Cape fur seal tooth dentine to determine whether collapses and geographical shifts of small pelagics were reflected in their diet. Historic samples from skulls housed in South African Museums since 1946, and modern samples from recently stranded animals along the south-coast of South Africa and Namibia were used. Potential sexual and ontogenic variations in the diet were controlled by only selecting canines from males and exclusively analysing tooth material deposited during the fourth year of each animal by fine scale drilling. The results of the two bioregions differed for the bulk SI values. This study highlights the importance of combining bulk SI analysis with compound specific SI analysis in temporal studies to avoid drawing biased conclusions regarding changes in the food web. It ultimately shows the value of using historical samples and data in predicting future ecosystem modifications in the context of global change.



Dr Greg Hofmeyr

The role of dedicated beach surveys in assessing unusual mortality events in marine mammals.

An important source of information on marine mammals are those that wash ashore dead, or swim or wash ashore alive (i.e. strandings). Systematic stranding programmes provide information on temporal and geographical distribution, sources of mortality, and other aspects of marine mammal biology. However, the search effort is variable, relying primarily on public reports. This study countered this by monthly beach surveys along sections of Algoa Bay and St Francis Bay, both close to the city of Port Elizabeth. These sections are seldom visited and are ideal locations for the accumulation of strandings, relatively undisturbed by human visitors. The variable search effort of stranding programmes can result in biases related to season, day of the week, and weather. Dedicated surveys increase the probability of finding specimens and allow for more accurate assessment of temporal trends.





Dr Andr ea Thebault

Cape gannet at-sea communities.

Group foraging is very common in seabirds. Due to their elusive lifestyle, studies of those behaviours and of the mechanisms involved have long been limited. Recent advances in technology have allowed us to finally tackle those questions. We studied Cape gannets *Morus capensis* breeding on Bird Island (Algoa Bay) since 2010. Using bird-borne video cameras we recorded the social interactions among birds when foraging at sea. We showed how social and group dynamics are fundamental in the foraging strategies of this species. The Cape gannets use their conspecifics as cues to locate inconspicuous prey. When aggregated over fish schools, they benefit from quasi-synchronous attacks to increase their feeding success. Using mini-acoustic tags we recorded their vocal communications during their trips at sea. We showed that the Cape gannets emit calls of different acoustic structure (i.e. conveying different information) depending on the behavioural context of emission. Thus, those seabirds use both the visual and the auditory channels when interacting at sea. Our results show that the Cape gannets are social animals, depending on their community to forage. The Cape gannet has recently been uplisted from Vulnerable to Endangered on the IUCN Red List. We will discuss the need to protect their foraging communities at sea.



Prof Guy Bate

The effects of rapid population growth and lack of planning on groundwater and coastal lake water quality in Maputoland.

Maputoland is small in comparison to South Africa and it has a very unique environment. It has a large nature-based tourism potential, is economically important, but is still largely rural. Much of the biodiversity value is due to the extensive coastal wetland systems arising from the sand aquifer, but the soils are low in plant nutrients. Water supply systems from Lake Sibaya cannot meet full demands, and so heavy reliance is placed on boreholes. The sewage systems all discharge somewhere into rivers and into the ground.

The area has also seen an increase in residents within the study catchment since 1950. This presentation will detail how groundwater flows into lakes, the nutrient levels in boreholes, and the effects of sewage discharge on the lake and estuary water. The economy in this area depends on tourism rather than on forestry, and future economic growth will depend on the future sewage system and its management.

Ms Zanele Hartmann

A social-ecological systems approach to integrated estuarine management: Swartkops Estuary.

A socio-ecological systems approach can be used in the integrated management of the Swartkops Estuary to lead to the transition for sustainable development of the resource, because it is increasingly recognised globally that complex systems, such as estuaries, are not managed in an integrated way. The consequences of this inadequate integration for the Swartkops Estuary are continued degradation pressures. The Swartkops Estuary is situated about 15km north of the Port Elizabeth harbour. The main catchment of the Swartkops River Estuary is the Groot Winter-Hoek Mountains to the west of Uitenhage and is approximately 1342km². The Swartkops and Elands Rivers are prime contributors of freshwater to the head of the estuary. In seeking to address the problems experienced in the Swartkops Estuary, the aim is to co-develop a novel, transformative management system with stakeholders through action research.



Dr Taryn Riddin

Mapping estuarine habitat: past, present and future.

South Africa has a high diversity of estuary types over three biogeographic areas. In order to maintain their health and conservation importance, and manage their ecological sensitivity, knowledge of habitat area is crucial. Estuarine habitat in SA totals 104,625 ha, across 394 estuaries. These habitats range from salt marsh, mangroves, submerged macrophytes, reeds and sedges, to open water and sand and mud banks. Early mapping efforts in the 1970s and 1980s described estuarine habitat and these form important reference data to study changes over time. In the early 2000s the Botanical Importance Rating method was formulated using habitat area and productivity. As a result South African estuaries were rated according to their conservation importance and estuarine health index. Through this and Ecological Flow Requirement studies, present habitat could be compared with past reference conditions, including what variability was due to changes in inflow and anthropogenic activities. The latest 2018 National Biodiversity Assessment of estuaries documents the entire habitat in South Africa. The inclusion of assistance from citizens further plays an important role in the mapping and documenting of habitat change.



The CMR enjoyed a very successful 2018,
and we thank you for the part that you
played in it!



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