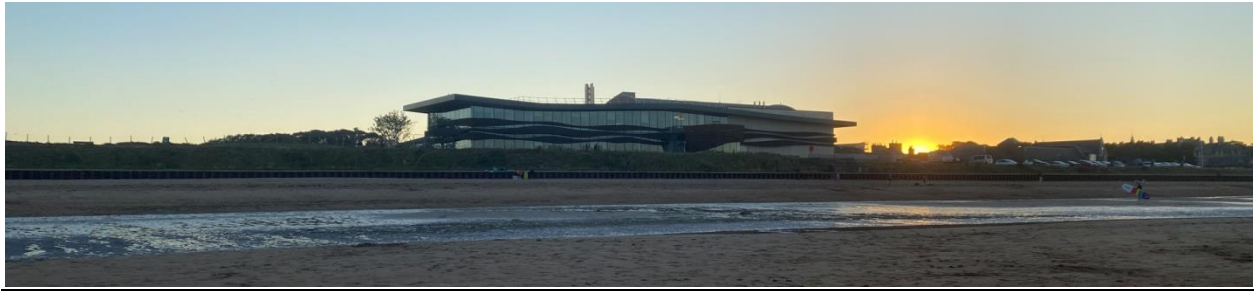


Report on FILAMO Visiting Scholar Grant to Dr T. Gridley, Report Nov 2022

I was awarded the FILAMO visiting scholar grant in 2019. Although initially proposed as a single extended visit, family and student obligations resulted in the reformation of the visit into 3 shorter stays, which stretched the funding to include student attendees from my research lab in South Africa. Unfortunately, the COVID-19 pandemic, including red listing of South Africa due to novel COVID-19 strains, resulted in delays to visit implementation. However, 2 visits have been successfully conducted (Jan 2019, Aug 2022) and one final visit is planned Dec 2022 (Gridley and Fearey). The following describes a summary of the key outputs of the visiting scholar support, as well as future planned work.



Sun rising behind the newly refurbished University of St Andrews Scottish Oceans Institute and Sea Mammal Research Unit

Project Context:

Cetaceans (whales, dolphins and porpoises) rely heavily on acoustic channels for their daily interactions with each other and their environment. Some dolphin species use individually distinctive signature whistles throughout their social interactions, most notably the bottlenose dolphin, *Tursiops* spp. Signature whistles develop within the first year of life and remain stable over time, thereby acting as acoustic labels (akin to names). Although proposed, acoustic monitoring of individuals using naturally occurring individually specific signals has rarely been attempted, particularly in the marine environment.

Extract from Application:

"The novelty and impact of this project lies in using non-invasive, naturally occurring acoustic labels in the marine environment to a) investigate the extent and temporal patterns of individual home-ranges, b) generate density estimates, and c) understand social and stock structure within two threatened dolphin populations. This project is both novel and ambitious, requiring careful consideration of research techniques and methodological refinement. Project implementation requires collaboration between field biologists, ethologists, ecologists, engineers and statisticians and therefore fits well within the remit of work supported by the FILAMO initiative."

Update on Activities

In addition to working with the named experts on the application, (specifically, Prof Vincent Janik, Dr Doug Gillespie, Dr Ellen Garland) our research visit/s have involved collaborative meetings and networking events with Dr Julie Oswald, Dr Volker Deecke, Dr Gill Braulik, Dr Jamie Macaulay and Dr Chloe Malinka. During the Jan 2020 visit (minutes attached, Appendix 1), we held a workshop with 11 attendees from 4 Universities which was designed to promote brainstorming and problem identification/solving on the topic of mark recapture of signature whistles. A pdf of the presentation on this topic is provided (Appendix 2).

During the visit, there were multiple smaller breakout meetings which helped strengthen links between myself, students and these scientists to facilitate the signature whistle research projects (see images below). Consequently, the research visit had multiple direct and indirect positive outcomes.

Paper's published relating/inspired/ influenced by this research visit include:

Longden EG, Elwen SH, McGovern B, James BS, Embling CB, Gridley T. Mark-recapture of individually distinctive calls—a case study with signature whistles of bottlenose dolphins (*Tursiops truncatus*). *Journal of Mammalogy*. 2020. doi: 10.1093/jmammal/gyaa081.

Fearey J, H. Elwen S, Distiller G, Gridley T. Improving detectability of dolphin signature whistles for capture-recapture analysis: an examination of array configuration using real-world data. *Marine Mammal Science*. 2022;38(4):1489-507. doi: <https://doi.org/10.1111/mms.12941>.

Malinka CE, Tønnesen P, Dunn CA, Claridge DE, Gridley T, Elwen SH, et al. Echolocation click parameters and biosonar behaviour of the dwarf sperm whale (*Kogia sima*). *Journal of Experimental Biology*. 2021;224(6):jeb240689.



Images taken during research visit to University of St Andrews in Jan 2020. The visit included meetings with A) Dr Jamie Macauley on automated whistle extraction and classification, B) Dr Chloe Malinka on echolocation detection, C) a dedicated workshop on mark-recapture of signature whistles attended by Prof Vincent Janik, Dr Volke Deecke, Dr Doug Gillespie, Dr Julie Oswald (End of workshop dinner shown) and others.

Extract from Application:

"There are already strong links between my current research host, the Centre for Statistics in Ecology, Environment and Conservation (SEEC, Department of Statistical Sciences, University of Cape Town) and the University of St Andrews. This mobility grant would therefore serve to strengthen academic links between the two research centres. "

Update on Activities

Academic links have been strengthened between myself/students and those at St Andrews, as a direct consequence of this research visit. Specifically, plans to co-supervise further students and collaborate on future research projects. The PhD students involved in the Jan meetings are now comfortable interacting with and asking advice from the scientists we met with, as relationships were formed over the course of the preceding marine mammal conference, the research visit and through subsequent email/ online interactions.

A consequence of the research visit was increased understanding and support for the African Bioacoustics Community (which I founded in 2018 to facilitate capacity building in Bioacoustics within Africa). Following on, Dr Macauley agreed to present in the 'Basics to Bioacoustics' special session at the 2020 conference, Dr Gill Braulik presented in the 'Hearing of Harms' special session, and both Dr Ellen Garland and Dr Chloe Malinka provided standard talks at the same event. This has strengthened ties between our research labs and facilitated capacity building for African based researchers both during the conference and from the associated online content.

See *African Bioacoustics Community Playlist*, under *Basics to Bioacoustics* - 'Why is PAM so Hard', J Macanley
<https://youtu.be/vgHCmvoGfvU>

Extract from Application:

"Although the majority of time will be dedicated to the proposed research on monitoring of acoustic labels, additional time will be used to grow related collaborations with Dr Luke Rendell and Dr Ellen Garland on humpback whale acoustic monitoring. "

Update on Activities

As a result of meetings held during the marine mammal conference and research visit to St Andrews, myself and Dr Garland decided to undertake the co-supervision of a post graduate student. The student, Ms Erin Ross-Marsh is currently completing her first year of a doctoral programme at the University of Stellenbosch studying humpback whale song structure. In fact., she was supported on a subsequent FILAMO travel grant for a research visit to Dr Garland's Lab to undertake training in whale song analysis earlier this year. My research visit in August 2022 was initially timed for July 2022 to overlap with Erin's placement, but due to passport delays this was not feasible. Never-the-less, during the August visit myself and Dr Garland spent important time running through the research project in more detail and crystallising the research direction and 2023 fieldwork objectives, so it was a very productive visit.

Extract from Application:

"During the placement, I will make the most of being close to continental Europe, by attending the 2nd World Marine Mammal Science Conference - a joining of the Society for Marine Mammalogy and European Cetacean Society conference - held in Barcelona, 9th to 12th Dec. I will use this opportunity to present the results from the first year of the project and solidify working relationships with international experts."

Update on Activities

We undertook a successful visit to the WMMS conference in 2019, immediately before the research visit to St Andrews. This was helpful in terms of presenting our research to the wider the scientific community and establishing connections prior to the St Andrews visit.



Sea Search team presented their work at the world marine mammal conference. Visiting Scientist, Dr Tess Gridley pictured top left. NB: All team members gave oral presentations on related work relating to the SWORD research project and / or whale song.

Extract from Application:

"I will conclude my visit by dedicating time to collaborative grant applications with the researchers I have been working with, as well as drafting reports and at least two scientific papers resulting from this research visit. Most notably, I will prepare fellowship (e.g. NERC, Royal Society) and lectureship applications, with the career objective of a permanent position within the UK or South African academic sphere. "

Update on Activities

The SWORD research project was awarded an additional 3 years of South African National Research Foundation funding at the start of 2022, and therefore has two years to run. During this time, we have been able to support 3 PhD students and a Post Doctoral Fellow. Following on from these visits, I intend to use 2023 NRF funding and the collaborative links forged, to facilitate follow up research visits by Dr Gui Frainer (Post doc) and Ms Rachel Probert (the only PhD student associated with the project who has not yet visited Uni. St Andrews). Furthermore, I will use the Dec 2022 trip to plan future grant application to support this work and its development along the East African coastline.

Although I did formulate fellowship applications in association with Prof Janik in 2019 (i.e. Marie Cuire), I no longer aspire to move back to the UK. Over recent years, I have established a solid foundation of research and research networks in Africa. My career has become more successful by continuing to work in South Africa, Namibia and Mozambique, directing the Sea Search NGO whilst maintaining strong academic links to local and international Universities. Notably, I have filled a niche not only in the bioacoustics field (through the development of the African Bioacoustics Community, for example), but also as the coordinator of a wide scale project investigating domoic acid toxicosis in Cape fur seals. During my final visit to St Andrews, I intend to meet not only with experts in both dolphin and whale acoustic monitoring, but also Prof Ailsa Hall with whom I am collaborating on the emerging Cape fur seal project to finalize our first scientific publication on this topic.

The itinerary of the Dec 2022 research trip, which I am conducting with PhD student Jack Fearey, is indicated below.

7th Dec 2022: Depart CPT to London

7th to 11th Dec: Travel by train to private residence in Baslow, UK , Private visit

11 the Dec 2022: Depart private residence to begin research visit by train travel to St Andrews (route Chesterfield to Leuchars)

12-16th Dec 2022: Undertake meetings with long term collaborators on dolphin acoustics research: Dr Julie Oswald (dolphin acoustics), Dr Gill Braulik (dolphin acoustics and conservation), Prof Ailsa Hall (seal biology) as well as attend seminars and meet with 2-4 additional scientific collaborators based at the University. During the trip, assist my UCT based PhD student, Jack Fearey to undertake the training he needs to finalise the dolphin whistle classification work he is undertaking, This is necessary for the completion of his PhD chapters. Furthermore, Jack will undertake a presentation on his work to other graduate students during his time in St Andrews

17th Dec 2022 - Return train trip to Baslow

18th Dec to Jan 17th: Undertake private visit

17th Jan 2023 - Return London - CPT