

## Report on the 2016 POGO-SCOR Fellowship Programme

This year saw the sixteenth fellowship programme implemented using POGO funds with supplementary financial support from SCOR. As the POGO Members had to be consulted on this year's budget expenditure at POGO's annual meeting at the end of January 2016, the announcement was posted on 9 February 2016, with a closing date of 15 April 2016.

This year saw a total of 41 applications, which was slightly fewer than the previous year. Applications were received from 19 countries.

With the combined available budget from POGO and SCOR, five candidates were selected and come from Argentina, Ivory Coast, Malaysia and South Africa. This year's host institutions include Helmholtz Centre for Ocean Research Kiel, GEOMAR (Germany), Hokkaido University (Japan), National Oceanography Centre (UK), Plymouth Marine Laboratory (UK) and University of East Anglia (UK).

The applications were screened independently by a committee of six, with representation from SCOR, POGO and partners of POGO. In making their selection, the committee considered the following factors:

- quality of the application;
- relevance of the application to the priority areas identified in the fellowship announcement;
- evidence that the training will lead to improved sustained observations in the region, or improved applications of such data;
- evidence that the training would lead to capacity-building with potential lasting impact on regional observations, and
- the need to maximise regional distribution of the awards.

POGO and SCOR commend the efforts from all the supervisors and colleagues at the various host institutions who agreed to devote time and energy required for the training. The programme would not have been viable without such efforts from prominent scientists and their teams.

All the people involved in each fellowship (the fellowship holder, the supervisor at the parent institute and the supervisor at the host institute) have been requested to submit short reports at the end of the training period. Many of the fellowships are just commencing or yet to be completed and their reports are expected to be received by

the end of the year. From previous fellowships, both host and parents supervisors as well as the fellows themselves have indicated that these exchanges should lead to effective capacity building at the host institute and facilitate longer term collaborations between the institutes concerned. All have previously concluded that the programme serves a useful purpose.

There is tremendous interest in the fellowship programme at all levels, both in the oceanographic institutions of the developing nations, as well as among leading scientists who are eager to contribute to this initiative. It is seen to be filling a niche in capacity building through specialised training that is not filled by intensive courses or by participation in scientific meetings. It helps improve the *esprit de corps* among oceanographic institutions around the world, and serves as a stepping stone to building collaborations.

Furthermore, the POGO-SCOR fellowship scheme is increasingly seen by other organisations as a model in capacity building, and similar schemes have been set up by other programmes based on the success of the POGO-SCOR model (e.g. EU projects, the Europe-Africa Marine Network, EAMNet; and the EUROMARINE consortium of European Networks of Excellence). The POGO Secretariat is often approached for help/advice on setting up similar fellowship schemes, or proposals to partner up with other organisations.

### **Demography of Fellowships**

#### **Parent Institutions:**

Argentina	Universidad Nacional del Sur
Argentina	Instituto Argentino de Oceanografía (IADO)
Côte d'Ivoire	Centre Universitaire de Recherche et d'Application en Télédétection (CURAT) /Université Félix Houphouët-Boigny (Côte d'Ivoire)
Malaysia	Universiti Malaysia Terengganu
South Africa	South African Environmental Observation Network

#### **Host Institutions:**

Germany	Helmholtz Centre for Ocean Research Kiel (GEOMAR)
Japan	Faculty of Fisheries Hokkaido University
UK	National Oceanography Centre
UK	Plymouth Marine Laboratory
UK	University of East Anglia

#### **Gender distribution**

Male: 4

Female: 1

## 2016 Fellows



### **Jethan d'Hotman – South Africa**

Parent supervisor and institution: Dr. Juliet Hermes – South African Environmental Observation Network.

Host supervisor and institution: Dr. David Smeed – National Oceanography Centre, United Kingdom.

Fellowship period: 1st October-31<sup>st</sup> October 2016 (1 month)

Topic: Enhancing South Africa's sustained offshore observational capabilities through Argo and mooring arrays.

Jethan d'Hotman's current role is the Agulhas System Climate Array officer and his responsibilities include assisting with the co-ordination of the second ASCA cruise. This involves liaising with an international team of scientists and technicians; ensuring all equipment is available and ready to be deployed in time for the cruise; assisting in the building of several tall moorings; writing sailing orders; workshop co-ordinations; report writing and ensuring all personnel meet all the requirements for going to sea. As part of this Jethan has been assisting in securing Argo floats (through the UK Met office) and SVP drifters (through the SA Weather Service) to be deployed as part of the cruise. Jethan previously completed a BTech in Oceanography. During his BTech, Jethan used near-real time data from an Argo float that was trapped in an Agulhas Ring to assist in understanding its characteristics as it propagated across the South Atlantic.

Jethan aspires to develop and grow the South African Argo community through the development of an Argo Data centre and international collaborations. This will lead to a collaborative effort in monitoring and understanding the world's oceans using relatively inexpensive means. Jethan aspires to be a leading role player in the data handling for South Africa's large mooring arrays as well as collaborating with international partners to ensure the data meets international standards.

Currently the South African Argo program is relatively small, having only contributed two floats to the Argo program with a hand full of scientists and technicians that arrange for other countries Argo floats to be deployed on local cruises, one or two small Argo projects and an education outreach teacher who educates disadvantaged school learners about Argo technology and its uses. It is vital that the South African Argo program grows to be an influential player in the global Argo program. For this to happen the first important step would be to develop the Argo data processing skills amongst personnel in the South African oceanographic community. This fellowship would provide an important base for this skills transfer between the international Argo community and South Africa.

Currently South Africa has two vital long term monitoring mooring arrays (ASCA & South Atlantic Moored Buoy Array (SAMBA)). For a global monitoring system to be effective, all mooring arrays and data handling processes need to be similar. This fellowship will allow for skills transfer from top research technicians working on data from the RAPID Climate Change Array and Overturning in the Subpolar North Atlantic Program (OSNAP) mooring

arrays directly link to the ASCA and SAMBA mooring arrays through the Agulhas Current and Agulhas Leakage.



**Ahon Jean-Baptiste Kassi – Côte d'Ivoire**

Parent supervisor and institution: Prof Kouadio Affian – Centre Universitaire de Recherche et d'Application en Télédétection (CURAT) / Université Félix Houphouët-Boigny (Côte d'Ivoire).

Host supervisor and institution: Dr. Marie-Fanny Racault – Plymouth Marine Laboratory.

Fellowship period: 12<sup>th</sup> September to 12<sup>th</sup> December 2016 (3 months)

Topic: Characterization and monitoring of upwelling areas in Ivorian waters for fishery valorization using remote sensing data.

Ahon Jean-Baptiste Kassi is currently a researcher and lecturer in remote sensing and oceanography at CURAT at Université Félix Houphouët-Boigny (Cote d'Ivoire). His work focuses on the study (identification, estimation) and mapping of potential areas of retention of pelagic species in the Ivorian continental shelf based on ocean parameters (chlorophyll concentration, sea surface temperature, salinity, wind, surface current, sea level, and wave height). The technique used to estimate potential areas of retention of pelagic species has provided researchers with interesting results, and in particular, areas of strong upwelling index related to high chlorophyll concentration and low sea surface temperature have been identified. To develop Ahon's work and to provide relevant information to support sustainable management of fisheries and protection of the marine ecosystem in Côte d'Ivoire, he requires training in applications based on remotely sensed ocean-colour observations and their analysis in relation to climate and environmental conditions. Plymouth Marine Laboratory (PML) has extensive experience in the development of applications based on remotely sensed biological and physical data and in their analysis and mapping for information and support to ecosystem management. Dr Racault has considerable experience in the study of environmental and climate impacts on marine ecosystem resources. She also uses the software Bilko to compile several types of satellite data and this visit will help Ahon to build capacity in this field.

The Ivorian continental shelf, located within the Large Marine Ecosystem (LME) of the Gulf of Guinea, is strongly subject to anthropogenic pressures associated with increased population, unsustainable fishing practices, etc. It is essential to implement appropriate monitoring strategies. During the training, Ahon will study some techniques to assess the influence of climate on marine resources and understand the mechanisms driving variations in primary producers. This information will be useful to characterisation and monitoring of areas of retention of pelagic fish species. Specifically, there will be opportunities to learn how to work with remote sensing biological datasets of chlorophyll concentration, primary production, phenology metrics, characterise the phenomenon of upwelling and enhancement of areas suitable for fisheries.

The Gulf of Guinea is highly affected by cloud cover, Ahon wishes to work with the ocean-colour data product that has been recently developed by the PML team as part of the European Space Agency Ocean-Colour Climate Change Initiative (ESA OC-CCI)

project. This new product has shown significant increase in data coverage, and this would be highly relevant for the study.

Ahon would like to understand further the operation and development of Bilko applications for the compilation and analyses of oceanic variables, and also work with the Bilko phenology application developed by Dr Racault. This training will allow Ahon to develop skills for the modeling of retention areas of pelagic species and therefore improve fishery activities that support the country's economy. CURAT and PML will establish collaboration with common research programs for the study of the location of favourable areas for fishing. They will involve students and researchers exchange along with experience on the impact of climate on the phytoplankton variability.



**Celeste López Abbate – Argentina**

Parent supervisor and institution: Dr. Gerardo Perillo – Instituto Argentino de Oceanografía (IADO).

Host supervisor and institution: Dr. Juan Carlos Molinero Helmholtz Centre for Ocean Research Kiel (GEOMAR).

Fellowship period: 1<sup>st</sup> July 2016 – 31<sup>st</sup> August 2016 (2 months)

Topic: Analysis and interpretation of coastal food webs exposed to growing synergistic effects of multiple stressors

Celeste López Abbate is currently studying the long term variability in the dynamics of phytoplankton and microzooplankton and their relationship with climate changes and anthropogenic activities in the SW Atlantic Ocean (northern Argentinian Shelf). The functional groups targeted in her current research have a critical relationship with mesozooplankton and fish larvae for which their study is a necessary step to understand not only fish recruitment, but carbon fluxes as well. In this scenario, a simultaneous analysis of functional groups, i.e. producers, consumers, at the base of the food web and multiscale physical forcing is required to quantify ecological responses to multi-stressors. Given the dimension of the database and the complexity of food web interactions, there is a pressing need to develop an analytical package to dig through all data and to extract general pattern that are usually masked in local and short-term studies. Thus, the training is intended to gain experience on the application of practical tools of big data analysis, i.e. data mining, temporal analysis and modelling of plankton networks and environmental data. This approach will reveal additive and synergistic effects of climate and anthropogenic activities on the productivity patterns of microplankton in the northern Argentinian Shelf.

The aim of the training program is to gain experience on the application of practical tools of data retrieval, temporal analysis and modelling of plankton and environmental data. The first part of the training would involve the development of a synoptic climatology and the characterization of the multiscale climate forcing. Principal components analysis, orthogonal functions and indexing will be used to identify space-time patterns, while wavelet analysis will be used to detect the time-varying signal of climate. The second part of the training would be focused on the detection of plankton-environment coupling. To characterize the relationship between plankton and

environmental variability, biotic data (chlorophyll-a, growth and mortality rate of phytoplankton, abundance, biomass and diversity of phytoplankton and microzooplankton) will be summarized and confronted with abiotic data associated with climate (SST, precipitation, atmospheric pressure, salinity, wind speed, etc.) and anthropogenic activities (concentration of nutrients, organic carbon, dissolved oxygen and turbidity). The obtained data set will be examined by means of generalized additive models (GAM and TGAM) and variance decomposition methods.

The quantification of net effects and their partitioning into direct and indirect effects will be estimated using structural equation modelling (SEM). This methodology has been increasingly used to disentangle complex community- or ecosystem level effects of environmental and climate change.

The training will enable the integration and interpretation of an extensive amount of multiscale biotic and abiotic data from different observation programs in the Argentinian coast. The amount of information gathered during the last 35 years in northern area of the Argentinian Shelf, which included field observations and laboratory determinations, represent a unique multi-institutional coordination in the southwest Atlantic coast. Institutions involved in the acquisition of data are the parent institution, Argentinian Oceanographic Institute (IADO), the Center of Renewable Natural Resources of the Semiarid Zone (CERZOS), the National Southern University (UNS), the Bahía Blanca Port Management Consortium, the Government of Bahía Blanca, the National Meteorological Service (SMN) and the National Oceanic and Atmospheric Administration (NOAA). So far, however, data from different sources have been analysed separately, thus providing limited information on long term patterns. The proposed training will provide a methodological package to properly exploit the extensive database produced by local researchers during the last decades. The learning will be summarised in a special R toolbox for time series analysis that will be shared with the Argentinian community through the IADO's webpage. In addition, data series will be parameterized and uploaded to the IADO's webpage to allow free access. The integrative analysis of data will provide the conceptual framework for posing new hypothesis that upgrade the current strategy of local monitoring and will encourage the execution of further oceanographic observations in the Argentinian coast.



**Mohd Fadzil Akhir – Malaysia**

Parent supervisor and institution: Prof. Wan Izatul Asma Wan Talaat - Institute of Oceanography and Environment, Universiti Malaysia Terengganu.

Host supervisor and institution: Prof. Tim Jickells - Centre for Ocean and Atmospheric Science, University of East Anglia.

Fellowship period: 1<sup>st</sup> – 30<sup>th</sup> November 2016 (1 month)

Topic: Data management and deployment planning for ocean glider and oceanographic buoy.

The marine environment is of major importance to Malaysia in terms of fisheries, offshore hydrocarbon extraction, proximity to major shipping routes and tourism. As a



principal researcher of physical oceanography in the institute, Fadzil Akhir currently leads a research team named “Malaysia Coastal Observation Network” (MyCON). The objective of this group is to develop better oceanographic observations and monitoring along the coast of Malaysia. Part of this effort is to plan for data collection, manage long term datasets and engage national experts to be part of this effort to widen the coverage area and also share resources in terms of equipment and data. Recently, Fadzil started integrating new technology into the framework by conducting WaveGlider deployments through industry engagement. UMT collaborates with Alam Sekitar Malaysia Ltd who distribute wave glider facilities in the region and the institution was chosen to become the first Malaysian institution to deploy wave gliders under the collaboration.

Fadzil plans to set-up a proper data management system that will in time also become accessible to other users who share similar intention to the GOOS initiatives. The required skills include producing data library, data formats, human resources skills and organising metadata. There are 2 areas that I wish to improve in our Malaysian ocean observation initiatives. Firstly, improving deployment planning and methods especially for ocean buoys and wavegliders. These will be part of our observation network program. Most of our deployments until now have been based on trial and error. So far we have lost 2 buoys and a wave glider.

Fortunately, we managed to retrieve the wave glider using our GPS system. I believe knowledge and skills from an experienced institution will improve our work. As part of this Fellowship I would learn from the host institution team about the synergies between different instrument platforms planning, deployment launch and recovery methods, contingency planning and maintenance work on buoys and gliders.

Secondly, since long term datasets and continuous observation data provide a lot of information, and require specific skills to manage such datasets, I want to look into the management system of smart buoy and glider datasets. Proper data and metadata treatment, adhering to international standards for quality control and linking up with global ocean observation systems is vital for data sharing. Currently, the data are not saved in a standard suitable for sharing via GOOS global ocean datasets library. It is vital to have well managed data sets from the start and I hope this Fellowship will allow me to learn how to develop the management of our long term datasets.

I also anticipate enhancing my research skills in this area by discussions with colleagues in the host institutions who are using these tools for their own research and monitoring activities I believe this effort will not only last during the period of the Fellowship, but will continue afterwards. The technical skills and data management set-up will always be a work in progress, thus I will continue dialogue with the hosts and hopefully this will turn into research collaborations. The overall outcome will surely benefit my country’s ocean observation networks and gain more understanding of our seas.



**Juan Manuel Molina – Argentina**

Parent supervisor and institution: Dr. Andrea Lopez Cazorla - Universidad Nacional del Sur.

Host supervisor and institution: Dr. Akihide Kasai - Faculty of Fisheries Hokkaido University.

Fellowship period: 3<sup>rd</sup> July – 26<sup>th</sup> September 2016 (3 months)

Topic: Application of NEMURO modeling frame in Argentinean fisheries.

Juan Molina has a strong background in fisheries science. For more than eight years he has studied fish communities from coastal and estuarine environments in “El Rincon” oceanographic system (Argentina). Juan’s field of research has always been related with biological and ecological aspects of marine fishes and focused on processes involved or related with fisheries. As an assistant in teaching and research of the Vertebrate Zoology chair of the Universidad Nacional del Sur (National University of the South; [www.uns.edu.ar](http://www.uns.edu.ar)), Juan is currently engaged in research activities concerning the influence of oceanographic variables in the distribution of fish and their seasonal ingress in the Bahía Blanca Estuary (Argentina) and the adjacent coastal areas. This research study is part of the project “Biology, ecology and fisheries parameters of Chondrichthyans that inhabit Bahía Blanca estuary and the adjacent coastal area”, funded by the National University of the South.

The mentioned project involves the integration of physical, chemical and biological oceanographic variables into species-habitat models. The implications in the long term will be very important in biological, conservational and social scales. Training and expertise in oceanographic observation, data management, and modeling of coastal areas would represent a very important asset for the progress of the research activities, and would substantially improve the scope of the project.

During the fellowship, Juan will be mentored by Professor Akihide Kasai from the Faculty of Fisheries Science of Hokkaido University, a leading expert in oceanographic monitoring and modeling of estuaries and coastal environments. Juan will receive training in oceanographic observational techniques and he will learn to process, manage and use that information to model oceanographic variables. Specifically, the use of the modeling frame “lower trophic level ecosystem model” (NEMURO; Kishi et al., 2007) will be learnt and the model will be applied to predict the spatial and temporal distribution of fish. NEMURO model frame is a powerful tool for oceanographic modeling in fisheries sciences, with numerous applications (reviewed in Werner et al., 2007).

Professor Kasai and his collaborators have extensive experience in the use and implementation of this modeling frame to the study of fisheries. As part of the fellowship Juan will also receive field training on how to collect data for the application of this model. This training opportunity would prove highly beneficial, for both the fellow and the home institution, because the current research lines on fisheries coastal and estuarine oceanography are incipient and recently emerging. On his return, Juan will use all the learned knowledge and expertise acquired to advance the research on the oceanographic study of fish distribution and seasonal ingress on Bahía Blanca Estuary and the coastal area around it, and on other projects to be developed in the future.

Being able to incorporate an adapted NEMURO modeling technique in Argentina would represent the first time in the application of such a tool at a national scale. The education and training of human resources in the implementation of NEMURO will contribute to extend the use of this Japanese modeling technique in Argentina.



At this point there has been no formal collaboration between scientists of Hokkaido University and Universidad Nacional del Sur, therefore a major motivation for this proposal is to start collaborative work between the Argentinean and the Japanese institutions involved. The visiting fellowship would be the first step in developing working relationships with Professor Kasai's institution. The establishment of such a relationship through this program, would increase future interactions between scientists from Argentina and Japan, and would also build the basis of additional bilateral collaborative studies related to the oceanographic sciences.