www.pogo-ocean.org

Report on the 2020 POGO-SCOR Fellowship Programme and Perspectives on the 2021 Programme

***Context**: The programme jointly funded by the Partnership for Observation of the Global Ocean (POGO) and the Scientific Committee on Oceanic Research (SCOR) is designed to promote training and capacity building leading towards a global observation scheme for the oceans. The Programme has been a success for over 20 years, with more than 160 fellowships awarded since 2001.*

The fellowship program is open to scientists, technicians, postgraduate students (preferably of PhD level) and post-doctoral fellows of developing countries and countries with economies in transition and involved in oceanographic work. The main purpose of the program is to advance sustained ocean observations and their applications by supporting training in oceanographic observations. Selected fellows are offered the opportunity to visit other oceanographic centre for a short period (1 to 3 months) for training on any aspect of oceanographic observations, analyses, and interpretation.

1) Fellowships awarded during the POGO-SCOR 2020

Due to current international travel restrictions three of the five fellows appointed last year started their training remotely and are still to complete. Two fellows have completed their training and return to country of origin. During the period of his fellowship, the POGO-SCOR 2020 Andrés Orejarena has published a peer-reviewed article with his parent and host supervisors at the Data in Brief Journal (see here), demonstration of increased networking and collaboration between institutes from developed and developing nations through the POGO-SCOR programme.

1.1) Abhisek Chatterjee (underway)

Country of Origin:  **Host Country:** 

Parent Institute: the Indian National Centre for Ocean Information Services (INCOIS), India
Host Institute: Centre for Ocean and Atmospheric Sciences - University of East Anglia, UK
Training topic: Processing and statistical analysis of the glider based observations to evaluate near-inertial oscillation induced mixing in the southcentral Bay of Bengal.

Status: Remote training in progress, Abhisek is expecting that the training will be primarily through the online mode.

Interim report on POGO-SCOR training by Dr. Abhisek Chatterjee
The ongoing COVID-19 pandemic hit hard across the globe affecting severely millions of people. Science is also not an exception. Owing to the travel restriction, the proposed training on "**Processing and statistical analysis of the glider based observations to evaluate near-inertial oscillation induced mixing in the southcentral Bay of Bengal"** is now decided to conduct using virtual platforms. Formally the training started on June 21, 2021.

The training is consists of two parts: (a) processing of glider data which includes decoding the metadata, cleaning, filtering, and finally gridding to a more uniform mesh for future analysis, and (b) develop a technique to extract near-inertial frequencies and understand its mechanisms.
For the first part of the training, the seaglider observations deployed during the BOBBLE (Bay of Bengal Boundary Layer Experiment) programme and SLOCUM glider observations collected during the first phase of the Deep Ocean Mission (DOM) programme are being used. The BOBBLE data ware downloaded from Webber et al. (2019; doi: 10/dgvj). The processing and analysis of BOBBLE and DOM data are in progress. For the seaglider data processing a Python based glider toolbox developed by SOCCO (Southern Ocean Carbon and Climate Observatory) of CSIR and for the SLOCUM glider data processing a Matlab based tool developed by SOCIB (Balearic Islands Coastal Observaing and Forecasting System) is being explored.

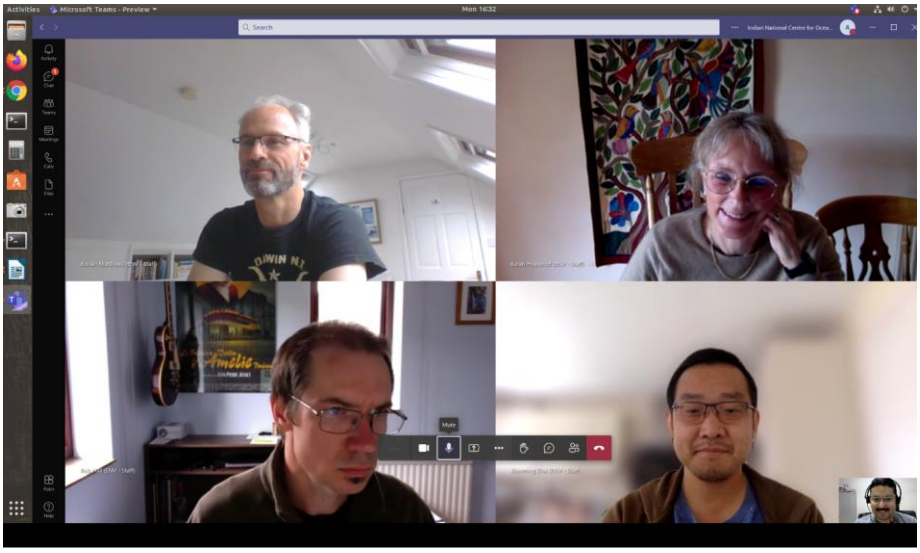

Figure 1: Kick-off meeting of POGO-SCOR training programme hosted by the University of East Anglia.

1.2) Ana Carolina Peralta Brichtova (underway)

Country of Origin:  **Host Country:** 

Parent institute: Universidad Simón Bolívar, Venezuela
Host Institute: Institute for Marine Remote Sensing, University of South Florida, USA
Training topic: Seagrass Assessment using optical satellite images: a case study at the Ocumare Cienaga.

Status: Remote training and travel arrangement is progress. Expected start date for the fellowship is September 13, 2021.

Interim report on POGO-SCOR training by Ana Carolina Peralta Brichtova

As part of her POGO-SCOR training program Carolina is now in the phase of reviewing some GEE tutorials and reading some Remote Sensing and Satellite image principles. Ms Peralta collected the *In situ* data to help validate some information present in satellite images. The fellow have been in touch with Dr. Enrique

Montes and Luis Lizcano Sandoval for some discussions through Zoom about the GEE tutorials and some preliminary images analysis.

Tasks	Start	End	Status
ONLINE TRAINING	26.05.2021	30.07.2021	in progress
Remote Sensing Principles. Follow GEE tutorials, EDU page for: spectral reflectance, spectral bands, spatial resolution, Landsat sensor, Sentinel sensor	26.05.2021	30.07.2021	in progress
Methodologies employed to detect seagrasses (Online meetings with Luis Sandoval and Enrique Montes, USF)	26.06.2021	30.07.2021	pending
In situ data collection for Optical Satellite Images analysis	26.06.2021	26.07.2021	pending
SEAGRASS ASSESMENT (Direct interaction at USF, USA)	01.10.2021	31.12.2021	pending
Methodologies employed to detect seagrasses, using optical satellite images.	01.10.2021	01.11.2021	pending
Technical and analytical procedures for observing and identifying seagrass coverage, using optical satellite images.	01.11.2021	31.12.2021	pending
Final report	01.12.2021	31.01.2022	pending

Table 2 – Carolina's training timetable.

1.3) Mahi Mankeshwar (underway)

Country of Origin:  **Host Country:** 

Independent researcher from India
Host Institute: Lamont Doherty Earth Observatory at Columbia University, USA
Training topic: Changing habits with changing seas: habitat study of marine megafauna in the Arabian Sea

Status: Remote training in progress, travel dates are not definite due to current travel restrictions.

Intermediate report on POGO-SCOR training by Mahi Mankeshwar

I have completed a review on the work done on marine turtles from the South Western Indian Ocean (SWIO). The aspects covered by the review included literature on important areas of nesting, foraging, trends in migratory patterns, use of geomagnetism in migrations and data gaps. I presented the results of this review to my advisor Dr. Joaquim Goes and collaborators of their study in the Arabian Sea.
In the coming days we will use open access data sets on turtle tracks from the region and run them on the information system DISCO developed by the team to closely study the migratory patterns and essential environmental parameters aiding the journeys of the turtles in the SWIO.

Remote sensing
During the intern meets organized by the Goes and Gomes Laboratory at LDEO, we have been learning the basics of remote sensing. The topics covered so far are:

1. A timeline of satellites put into orbit

2. Types of satellites
3. Data products
4. Atmospheric corrections
5. Applications

Data Download: We were given an introductory lesson on accessing and downloading data from the NASA Oceancolour database with demonstrations on using Level 2-and Level-3 datafiles.
We were also introduced to NASA's SeaDAS software and are currently practicing data downloads and visualizations on it using Arabian Sea as the study site.

Fisheries Review
I have undertaken a brief review of economically viable fish species fished in Indian waters. Given the rampant advance of noctiluca blooms every year, there might be repercussions on Indian fisheries. I am interested in understanding the life histories of these economically important fish and try to project via models how each of the species might be affected by changes in their habitats caused by noctiluca blooms.

1.4) Andrés Fernando Orejarena Rondón (completed)

Country of Origin:  **Host Country:** 

Name of Supervisor (Parent Institution): Juan Camilo Restrepo López, Universidad del Norte, Colombia.
Name of Supervisor (Host Institution): Alejandro Orfila Förster, Instituto Mediterráneo de Estudios Avanzados, Spain.
Training topic: Global change impacts on the Colombian Caribbean coasts: analysis and risk of wave climate and sea level.
Dates of Training: January 25th- April 9th 2021

Final report on POGO-SCOR training by Andrés Rondón

Please provide a brief description of activities during the training period.
During the training period at the Mediterranean Institute of Advanced Studies (hereinafter IMEDEA) the following tasks have been carried out: - Configuration and maintenance of tide gauges: frequency sampling; aliasing; data processing (time domain vs. frequency domain); sensor configuration. - Configuration and maintenance of wave buoys and ADCP (Acoustic Doppler Current Profiler) sensors: frequency setting; data processing; maintenance; communications. - Wave modelling (SWAN and XBeach models) for wave propagation from deep to shallow waters. - Long term wave modelling for climate studies. Generation of a 60 year wave hindcast over the Caribbean Sea (see attached document). - Short curse on gliders. Use, perspectives, data processing of Slocum glider.

What applications of the training received do you envision at your parent institution?
The use and application of the SWAN and XBeach models is possible to train students in the Universidad del Norte. Similarly, for training peers in other institutions in the country. These models could be used with the aim to characterize the wave parameters in deep and shallow waters and their affectation in the coastal zone. The use and application of these models is crucial due to the lack of wave parameters recorded by devices in the Colombian coastal zone. On the other side, the use and settings of the devices for recording waves, learned during the training, will be used for the validation of numerical models. The implementation of real time monitoring programs in Colombia in coastal and marine areas would be of great benefit for mitigation of global change effects as well as to provide scientific response to societal

needs (coastal harmonization, coastal uses, beach and coastal erosion, marine safety, oil spills, among others. Besides, the use of new technologies such as the Gliders for monitoring purposes, could provide autonomous and relatively cheap observations in both of the Colombian oceans with a large improvement in the availability of data for the scientific community. My objective is to promote the use and setting of these technologies at the national level involving my parent institution and the National Authority as well as involving other higher teaching institutions (Universidad Nacional, INVEMAR, etc.) to generate the basis of a coastal observing system.

Please provide your comments on the Fellowship Programme.
I am very happy to have had the opportunity to train in the IMEDEA/SOCIB institute with one of the world leading groups in coastal and ocean sciences thanks to the POGO-SCOR Fellowship Program. This approach between institutes opens the possibility to future cooperation of training peer-to-peer support and exchange of experiences. The financial support was enough for the maintenance during the training and the traveling to Bogota -Palma de Mallorca - Bogotá. The communication and support by email with the administrative coordinator was always clear and very helpful to support when was necessary.

Andrés' Host supervisor

Please provide your comments on the performance of the trainee
The PhD. candidate Andrés Orejarena performance has been very satisfactory. He has been working in different topics related to ocean data modelling and data analysis, working with different instruments and techniques. He was able to apply different approximations to solve complex problems through wave models in deep and shallow waters. I strongly think that he can take profit from all the knowledge that he has acquired to his future career in Colombia. At the personal level I found him a very pleasant person. He was always able to interact with different scientists at all levels (pre, postdocs and senior researchers) in many different topics. I am convinced that we will continue collaborating in the future to address many scientific problems.

Is this exchange likely to lead to future collaboration with the trainee's parent institution? If so please give example(s) of how this collaboration may be pursued.
Yes, we can collaborate with the parent institution in the planning and implementation of monitoring platforms to collect oceanographic data in the Caribbean Sea or the implementation of beach monitoring systems. Furthermore, we could train students and professors for the operation and maintenance of these devices.

Please provide your comments on the Fellowship Programme.
This is the second time that we hosted a Trainee from this Programme and the results have been excellent. We will host in the future Fellows from POGO-SCOR since this is a unique opportunity to teach foreign pre and post-doctoral researchers for short term periods in a different environment. The economic conditions for the trainee were good for the period of his stage. I would like to have more information for future calls.

Andrés' Parent supervisor

Do you agree with the above comments and do you have any additional feedback you wish to provide?
I completely agree with the comments presented above. According to the feedback from the student and the host supervisor, this training was not just highly fruitful for advancing in specific activities of the doctoral research but also to the career and projection of Mr. Orejarena, since it allowed him to expand his knowledge on valuable disciplines, establish links with peers and well-known researchers, and gain access to novel resources and tools. Undoubtedly, it was a significant experience.

OBSERVATION: As an output of this fellowship, Andrés has published a peer-reviewed article with his parent and host supervisors at the Data in Brief Journal (see here).

www.pogo-ocean.org

1.5) Hajar Idmoussi

Country of Origin: **Host Country:**

Name of Supervisor (Parent Institution): Pr. Errhif Ahmed, Hassan II university, Morocco
Name of Supervisor (Host Institution): Dr. Franz Peters, Institut de Ciències del Mar (CSIC), Spain.
Training topic: Trends in phytoplankton groups in the Mediterranean continental shelf off Morocco
Dates of Training: January 18th, 2021 – April 14th, 2021

Final report on POGO-SCOR training by Hajar Idmoussi

Please provide a brief description of activities during the training period.
During the training period, I learned how to determine Phytoplankton Functional Types (PFT) and Phytoplankton Size Classes (PSC) based on satellite remote sensing data and contrast them to *in situ* measured data. I also learned how to calculate phytoplankton biomass from microscope counts and size measurements. This is necessary in order to contrast satellite data for my research in biological oceanography. I have learned a wide variety of practical skills such scaling the microscope ocular ruler with a calibrated microscope slide to get the physical measurements of phytoplankton and using ImageJ software with microscope images. I have also learned to handle satellite and other .nc files with Panoply and have started to learn Matlab scripting. I have also learned to use several statistical tools (e.g. PCA). In addition, I have gained experience with ODV to visualize surface plots, sections and profiles of oceanographic data. I have also been working on writing a scientific paper, under the supervision of my advisors, to publish the work that I have done during my stay in Barcelona.

I have also participated in two sampling efforts done in the NW Mediterranean coast in order to gain experience with several analyses protocols. One such effort consisted in the participation in a multiyear monthly survey in the coast of Barcelona. A second coastal sampling was done after a major Saharan dust intrusion in a coastal area north of Barcelona. Analyses consisted in the extraction of pigments for total chlorophyll a determination, processing water with muffled (450 °C, 4 h) GFF filters for particulate organic carbon (POC) analyses, filtration with 0.4 µm cellulose ester filters for total suspended solids (TSS), inorganic nutrients, total phosphorus, Scanning Electron Microscope X-Ray Microanalyses, and fixation with formol-hexamine for phytoplankton identification.

What applications of the training received do you envision at your parent institution?
Many satellite products are freely available and allow for all kinds of synoptic and long-term studies of the marine environment, including the important primary production components that are subject to climate change. I envision many possible applications of the skills acquired during my stay to study the Mediterranean Sea ecosystems and other seas worldwide and compare remote sensed data with in situ measurements in order to have a better comprehension of the systems and hence now and in the future.
In my parent institution, the extraction of chlorophyll a is the only method used for the approximation of biomass. Now, with this training, I am able to calculate the autotrophic carbon biomass to understand either the phytoplankton composition, or the primary productivity of the ecosystem. Also, from chlorophyll and POC, one can calculate the heterotrophic carbon.
I will disseminate and share all these skills to whoever is interested at my home institution for the economic growth and sustainable management for our country.

Please provide your comments on the Fellowship Programme

This fellowship programme is the best opportunity to build capacity in both host and parent institutions and to establish international long-lasting scientific collaborations. I highly recommend to everyone that want to develop his or her professional career.

Hajar's Host supervisor

Please provide your comments on the performance of the trainee.
Ms. Idmoussi is an open-minded fast learner. She is a hard worker and her collaboration has not only given her new skills but has provided me with the opportunity to work with data from the Alboran Sea, a highly interesting region that I had not studied in detail before. I would like to think that one of the added benefits from her stay is that her approach to oceanographic questions is now beyond descriptive and more hypothesis-driven, answering questions of general interest that have an added value.

Is this exchange likely to lead to future collaboration with the trainee's parent institution? If so please give example(s) of how this collaboration may be pursued.
Ms Idmoussi has started to write a scientific paper in which I am also collaborating. This paper will be soon ready to be sent to a peer-review journal with a good impact factor. From this work, some further questions arise that we plan to continue pursuing together, each at his/her own institution and communicate through videoconferencing and the like. Ms Idmoussi has asked me to be part of her PhD thesis committee. This will also keep us further connected.

Please provide your comments on the Fellowship Programme.
I think this is an excellent opportunity for students to be trained in skills at other institutions, in addition to generate scientific collaborations between scientists and institutions in different countries. A possibility for a longer placement (4 to 6 months) would be desirable if this fits the students' purposes. Also, in retrospective, I understand from talking to Ms Idmoussi that the monthly allowance has been a bit on the short side, which may be a heavy burden for some students.

Hajar's Parent supervisor

Do you agree with the above comments and do you have any additional feedback you wish to provide?
I fully agree with the comments above. I believe that this fellowship programme has allowed Ms Idmoussi to gain access to a renowned institution and to develop new skills in a very short period of time. I am sure that this fellowship will contribute greatly to the improvement of her scientific research and will allow her to better value her efforts.

2) The POGO-SCOR 2021 Fellowship Programme

2.1) Application process

The twenty-first round of the POGO-SCOR fellowship programme was announced in March 2021 with an initial deadline for 30 April 2021, postponed to 14 May 2021. The call was announced via mailing list (see here) and social media (see here). The application documents required consisted of an application form, quotes for flights, and letters of support from the parent institute (where the applicant is located) and from the prospective host institute.

A total of 42 valid applications were received this year (less three than last year), exactly divided between female and male candidates. Applications were received from 27 countries (an increase of 3 countries in

comparison to POGO-SCOR 2020) from Asia (17 applications), Latin America (14) and Asia (11 applications). In a similar trend to last year's call, the candidates proposed 33 distinct host institutes, majorly located in Europe (30 applications to 21 institutes in 10 countries), followed by North America (8 applications to 8 institutes in the USA).

Applicants were asked where they heard about the programme call and 60% indicated POGO/SCOR mailing list, social media or websites (33%) or sent to their emails by teachers and supervisors (26%).

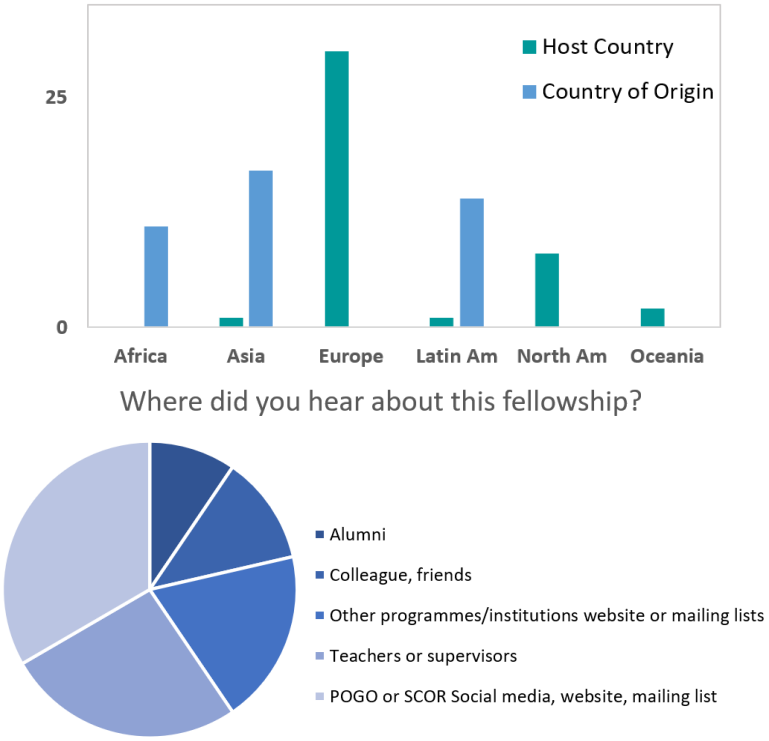

Figure 3 - Summary of valid applications for the POGO-SCOR Fellowship Programme 2021 (Top) Geographical distribution of candidates' country of origen and proposed host institutes' country, and (Bottom) where the applicant heard about the fellowship.

2.2) Review Process

Applications were evaluated independently by a committee of four representatives of SCOR and POGO Secretariat and one independent reviewer (former host supervisor). Each member of the Review Committee scores the applications according to the following criteria: quality of applicant, quality of proposal, quality of host institute, relevance to POGO-SCOR and priority areas identified in the call for proposals, and potential for sustained capacity building in the parent institute/country. The scores are then totalled and the budget for top-ranked applicants are calculated. Six top-ranked applicants were selected according to the budget available, with consideration given to gender and geographical balance.

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/trainee, the supervisor at the parent institute and the supervisor at the host institute) have been requested to contribute to a short report and testimonial at the end of the training period.

2.3) Fellowships awarded for the POGO-SCOR 2021

2.3.1) Carolina Gramcianinov (TBC)

Country of Origin: **Host Country:**

Parent Institute: University of São Paulo, Brazil.
Host Institute: Institute of Coastal Systems Analysis and Modeling - Helmholtz Centre Hereon, Germany.
Training topic: Integrated wave modelling and observation system in the South Atlantic Ocean.
Proposed start date: 01 Sep 2021

2.3.2) Stella Patricia Betancur Turizo

Country of Origin: **Host Country:**

Parent Institute: Center for Oceanographic and Hydrographic Research of the Caribbean (CIOH), Colombia
Host Institute: Instituto de Investigaciones Oceanologicas, Mexico.
Training topic: Biogeochemical parameters analysis at Antares Cartagena station and its climatic variability in the Colombian Caribe region.
Proposed start date: 01 Sep 2021

2.3.3) Pranav Pulukkayi

Country of Origin: **Host Country:**

Parent Institute: ICAR-Central Marine Fisheries Research Institute, India
Host Institute: Plymouth Marine Laboratory (PML), UK
Training topic: Use of sentinel satellite data for mangrove mapping and conservation.
Proposed start date: 01 Oct 2021

2.3.4) Dava Amrina

Country of Origin:  **Host Country:** 

Parent Institute: Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG), Indonesia.
Host Institute: SCRIPPS Institution of Oceanography, USA.
Training topic: Karimata Strait Variability in relation to Northeasterly Cold Surges and their Impact on Regional Rainfall.
Proposed start date: 01 Mar 2022

2.3.5) María Mendez

Country of Origin:  **Host Country:** 

Parent Institute: Instituto de Biologí-a de Organismos Marinos (IBIOMAR), Argentina.
Host Institute: Universidade de Vigo, Spain.
Training topic: Effects of increased environmental stress on coastal biodiversity.
Proposed start date: 15 Feb 2022

2.3.6) Cristhian Asto

Country of Origin:  **Host Country:** 

Parent Institute: Instituto del Mar del Peru – IMARPE
Host Institute: Mediterranean Institute of Oceanography going to the Mediterranean Institute of Oceanography, France.
Training topic: Glider training for coastal monitoring in the Peruvian upwelling system.
Proposed start date: 31 Oct 2021