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Report on the 2023 POGO-SCOR Fellowship 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 195 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.

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 development, 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, IOCCG Platt Scholarship, PML Trevor Platt fellowship). The POGO Secretariat is often approached for help/advice on setting up similar fellowship schemes, or proposals to partner up with other organisations.

Selection process in 2023

The 23rd round of the POGO-SCOR fellowship programme was announced on 13 April 2023, with an initial deadline of 15 May 2023, without the need to extend it. 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.

In keeping with previous years, a total of 46 valid applications were received this year, with 54% female and 46% male candidates. Applications were received from 16 countries from Asia (50%), Latin America (33%) and Africa (17%). Applicants proposed trainings of one, two or three months in oceanographic centres in Europe (61%), North America (17%), Asia (13%), Oceania (7%) and Latin America (2%) (Figure 1).

Applications were evaluated independently by a committee of eight, with representatives of SCOR and POGO Secretariats, SCOR Capacity Development Committee and one independent reviewer (former host supervisor). Each application was reviewed by three members of the Review Committee, randomly selected, and received scores according to: quality of applicant, quality of proposal, adequacy of host institute/supervisor, relevance to POGO-SCOR and priority areas identified in the call for proposals, and potential for sustained capacity development in the parent institute/country. The scores were then totalled and the budget for top-ranked

applicants were calculated. The five top-ranked applicants were selected according to the budget available.

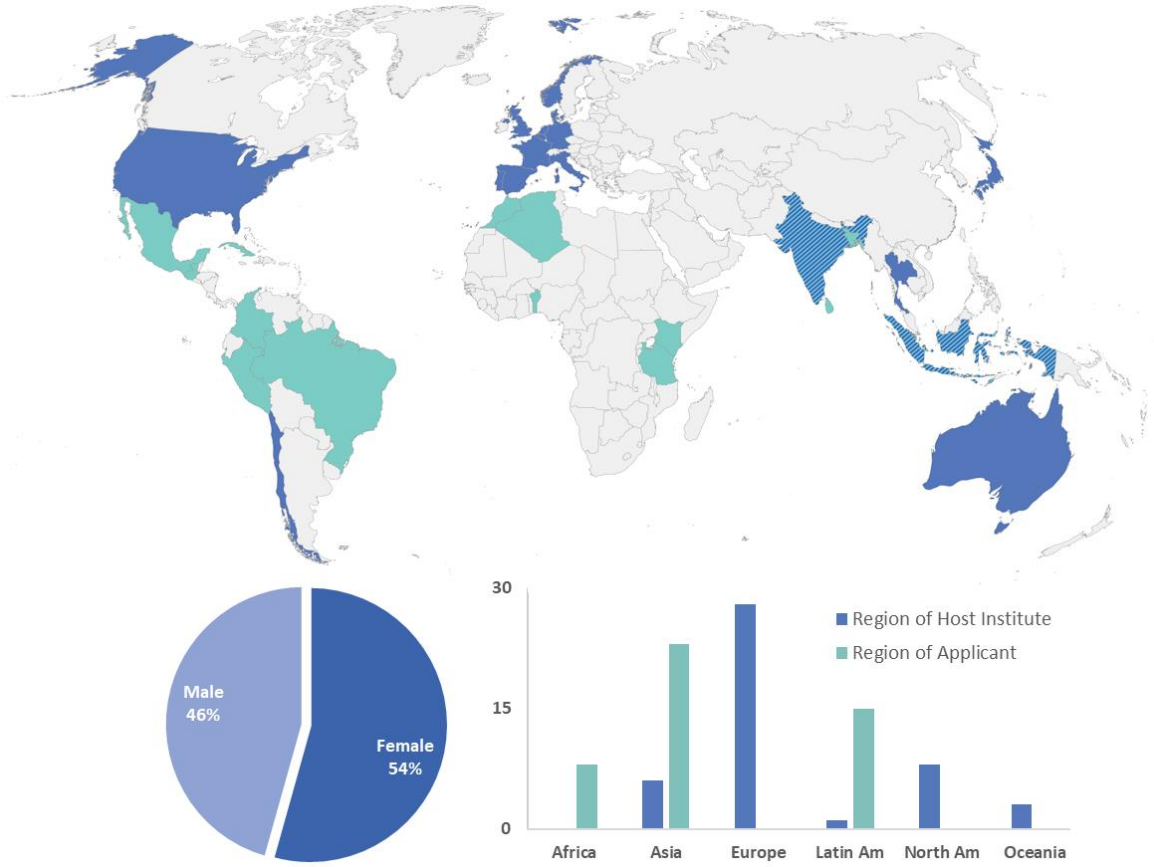

Figure 1 – Demography of 2023 POGO-SCOR Fellowship Programme applications (n=46).

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.

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Reports from 2023 Fellows and their Host Supervisors

Report from fellow: Daniel Felipe Bernal Glen

Country of Origin: **Host Country:**

Parent Supervisor and Institute: José Ernesto Mancera Pineda, Universidad Nacional de Colombia, Colombia.

Host Supervisor and Institute: Diana Ruiz-Pino, LOCEAN, France.

Training topic: Advanced Automatic Techniques based on Artificial Intelligence for Phytoplankton Counting and Identification

Training dates: 17th October 2023 - 14th January 2024

Please provide a brief description of activities during the training period.

Training on advanced Scanning Electron Microscopy (SEM) at LOCEAN (Laboratoire d'Océanographie et du Climat: Expérimentations et Approches Numériques) and CR2P (Centre de recherche en paléontologie de Paris); at Paris, France: This phase of the training occurred under the supervision of Dr. Diana Ruiz-Pino from LOCEAN and Dr. Sylvia Gardin from CR2P. The following activities were developed:

- Advanced training in the principles and conceptual basis of Scan Electronic Microscopy.
- Advanced training in the and operation of mini-SEM located at CR2P, including preparation of samples, basic calibration of the equipment, image obtention and processing.
- As product of the training, 27 samples from Colombian Caribbean were processed to take images and morphometric measures of the most representative organisms of phytoplankton (diatoms, dinoflagellates, coccolithophorids).

Two other training related to the observation of phytoplankton were organized by Dr Diana Ruiz Pino (Sorbonne University, S.U.) at the Roscoff marine station of the S.U. (French Bretagne) and at the CEREGE (CNRS) laboratory in South of France. Those training were supported financially by S.U. and by COCAS (Ocean Decade project, ANR France).

Training on automatized recognition of phytoplankton through automatic neural networks at CEREGE (Centre de recherche et d'enseignement des géosciences de l'environnement); at Aix-en Provence, France: This phase was centered in Artificial Intelligence methods for the recognition and counting of different types of phytoplankton, under the supervision under PhD. Luc Beaufort, researcher at this institution. The following activities were developed:

- Mounting of 8 samples from Colombian Caribbean to quantification of PIC (Particulate Inorganic Carbon) and counting of the main species of coccolithophorids through SYRACO method. The information will be employed in an upcoming paper about phytoplankton of Deep Corals National Natural Park, Colombian Caribbean.
- Learning of fundamentals and functioning of SYRACO, an automatized method based on neural networks for the recognition and quantification of coccoliths in paleontological cores, that also can be applied (with limitations) in the quantification of living coccolithophorids of the actual ocean.

- Training in the mounting of samples for SYRACO and image acquisition through optic microscopy.
- Learning of fundamentals of image segmentation through ImageJ as preparation for SYRACO utilization.
- Fundamentals of neural networks training for recognition of another organisms, such as diatoms or foraminifera. Some of these neural networks work through an alternative approach respect to SYRACO. Application of commercial software to this task, such as RESNET50 or YOLOv5.

Internship at Station Biologique de Roscoff of Sorbonne University; at Roscoff, France: The internship was developed under supervision of Ing. Ian Probert. The topics covered were:

- Visit to Roscoff Culture Collection, one of the biggest banks of phytoplankton and algae strains in the world. The visit included including culture facilities, seawater tanks, seeding area, freezing area and long-term storage of strains.
- Demonstration of the procedures of strain reseeding, storage, and cryopreservation.
- Demonstration of flow cytometry as tool for counting and long-term monitoring of picoplankton and nanoplankton.
- Instruction about the procedures for sampling preparation: successive filtrations to subdivide the sample by organism size, technics of filtering.
- Complementary acquisition of images at the mini-SEM located in the Biologique Station. Some selected samples from the Colombian Caribbean Sea were also analysed with the Roscoff Mini SEM to acquire better resolution images.

Training on Advanced Measurement of Inorganic Dissolved carbon (DIC) and Total Alkalinity (TA) at LOCEAN; Paris, France: This phase of the training occurred under the supervision of Dr. Diana Ruiz Pino and Ing. J. Finn (SNAPO National CO2 Services- LOCEAN) and included:

- Principles of the method of measurement of DIC and TA.
- Functioning of the equipment.
- Analysis of data and quality control.

The information obtained during the internship, and the techniques and principles learned (SEM imaging, recognition based on IA and measurement of carbonate system) will be employed in an upcoming paper about phytoplankton of Deep Corals National Natural Park and its relationship with carbonate cycle in Colombian Caribbean.

What applications of the training received do you envision at your parent institution?

- **Acquisition of a mini-SEM**: Mini-SEM equipment available at LOCEAN and at Roscoff Marine Station is suitable for activities of teaching and research. Instead of big SEM equipment, that have elevated cost of acquisition and operation and must be operated by specialized technicians, the mini-SEM has a much lower cost and can be operated by any researcher or student with minimum training. Even if the capabilities of mini-SEM are not as extensive as the capacities of a big equipment, the relationship between quality and cost is very favourable for research at institutions from developing countries.

- **Implementation of technologies for automatic recognition of phytoplankton**: Technologies for image recognition through neural networks are widely available, so it's suitable to develop systems specialized on phytoplankton of Colombian Caribbean and Pacific. It's possible to

explore strategies for a transference of knowledge between CEREGE and National University, since CEREGE has almost 20 years of experience in this topic. Potential applications of this technology are not only limited to this topic, but is potentially applicable to all environmental monitoring, such as other phytoplankton (diatoms), foraminifera, palynology, or air quality monitoring (counting of pollen, spores, etc.). It's necessary to point that techniques based on IA have never been implemented in Colombia for phytoplankton analysis, so, the implementation and development of these techniques adapted to local context could be a very interesting branch of research within the country.

- **Exchanges between researchers from Colombia and France in the field of oceanography**: Although there is a wide academic cooperation between Colombia and France, this is relatively scarce in the field of oceanography. During this internship various contacts were made between the National University and the researchers at LOCEAN, CEREGE and Roscoff Biologique Station. With this basis, it's intended to widen opportunities of cooperation between those institutions.

Please provide your comments on the Fellowship Programme.

I would like to publicly thank POGO – Partnership for Observation of the Global Ocean and SCOR – Scientific Committee on Oceanic Research for the opportunity to develop this internship through the program POGO – SCOR Fellowship 2023. I consider this program to be extremely important for the communication among researchers and institutions from different parts of the world. It would be very valuable that this program stays in time and expands to include more oceanographic institutions, universities, and public research institutions, and to favor a more complete net of exchanges of knowledge and researchers, not only between developed and developing countries, but also among developing countries from different continents (exchanges South – South).

Report from Host Supervisor:

Please provide your comments on the performance of the trainee

During all internships, Daniel showed great motivation for learning the three techniques related to the analysis of phytoplankton observation - in which he was trained. Thanks to his initiative and dedication to work, Daniel not only learned more techniques than were planned, but he was also able to successfully analyze oceanographic field samples taken in Colombia. These analyzes, complemented with classical microscope techniques and measurements of physical and chemical variables, will allow Daniel to make a publication on the relationship between abundance and calcification of coccolithophorids with acidification in the Colombian Caribbean Sea (co-authors: LOCEAN, CR2P Sorbonne Université, CEREGE-CNRS and its institution of origin, Universidad Nacional de Colombia). The internship also served Daniel to learn and improve sampling and preservation techniques for samples collected in-situ for the observation of phytoplankton, during oceanographic cruises. These techniques and protocols need to be reinforced in some projects developed in Colombia, since it was confirmed that errors in the sample acquisition led to the loss of part of the phytoplankton material.

The training on carbonate system measurement could not be entirely carried out since the potentiometric system used in LOCEAN to measure Alkalinity and DIC (Dissolved Inorganic

Carbon) was subject of repairments during several months. However, the knowledge and know-how that Daniel was able to acquire regarding calibration and validation techniques, will allow him to be able to use and interpret chemical data referring to the carbon cycle and transfer his experience to the Colombian Laboratory where we are now developing the measurement of the CO2 system. (Universidad Nacional and Universidad Javeriana).

Also, I confirmed that I am agree with the comments and conclusions that Daniel presented as brought from his internship. The internship duration was not only prolonged on Daniel's initiative, but brought more results than planned and new cooperations including other French laboratories: the CEREGECNRS of Aix-en-Provence, the Roscoff Marine Station of Sorbonne University and CR2P associated with CNRS and S.U.

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.

Colombia has the opportunity of carry out studies about the disturbances of the chemical marine environment at tropical seas, as well as the characterization and quantification of the ecosystems needed for the offset of CO_2 emissions. The techniques that Daniel learned in France could help Colombian institutions – such as universities or research institutes – on its own projects aimed to quantify the contributions of marine plankton over the climate change. The acquired know-how and the excellent contacts that Daniel created during his work will be a great contribution for the development of projects in future cooperation between France and Colombia.

1) Image acquisition with mini-SEM is inexpensive and straightforward. Together with the techniques based on IA for the automatic identification of phytoplankton, it emerges as an attractive low-cost approach that can be implemented within Colombian institutions. This implementation will have the contribution of researchers from the network associated to this internship in France (a financial support from the IRD – Institute of Research for Development – is prospected).
2) Project in cooperation for exchange of students from Universidad Nacional at Colombia and from Sorbonne Université at France (cooperation agreement that could take place in 2024).
3) Within the COCAS project (Ocean Decade, United Nations) led by Dr. Diana Ruiz Pino and Dr. Alban Lazar (Sorbonne Université), a sub-project called COLOMBIA COCAS will be submitted in October 2024, for the recording in real time the CO_2 system and ocean acidification within Colombian Caribbean Sea ecosystem. This project will have bilateral financing, including ANR (Agence National de la Recherche) in France.

Please provide your comments on the Fellowship Programme.

The POGO-SCOR Fellowship is an efficient way to transfer knowledge and know-how, but also to creating new cooperation between research institutions from the North and the South.

Currently, and considering the cultural differences and material conditions between the countries of the North and the South, I propose that, within the necessary framework of the diversity of cultures and scientific cultures, internships for students from the Global North who do internship in the global South should be also proposed; as well as South-South exchanges.

Methodologies such as “extension projects” in Latin America (close and innovative relationship between the academic environment, research, and society) and a knowledge of the great local biodiversity, as well as the non-abandonment of classic techniques (such as taxonomy, in South Asia, Africa and Latin America) are all sources of knowledge that must be considered in the international exchanges. The fellowship could then include and favor the possibility for the South to contribute and share their knowledge about their own territory and resources.

Southern latitudes share similar ocean phenomena and, often, similar logistic contexts and practices. Sharing experiences and know-how between different countries in the Global South could also provide a new way of thinking and doing about the development of oceanography, marine biology, and biogeochemistry in the context of sustainability.

Report from Fellow: Roma Varghese

Country of Origin:  **Host Country:** 

Parent Supervisor and Institute: Mukunda Dev Behera, Indian Institute of Technology Kharagpur, India

Host Supervisor and Institute: Dr. Swadhin Behera, Japan Agency for Marine-Earth Science and Technology, Japan.

Training topic: Detection and prediction of Marine heatwaves in the Indo-Pacific region using advanced AI techniques.

Training dates: 25th August - 25th November 2023

Please provide a brief description of activities during the training period.

The training program commenced with few lectures providing insights into the dynamics of marine heatwaves. These sessions laid the foundational understanding necessary for the subsequent modules. Following the theoretical framework, the training seamlessly transitioned into practical applications. A pivotal aspect of this hands-on phase centered on the application of R programming-based tools to detect marine heatwave events that occurred over the past 40 years (1982-2022). Sea surface temperature data from OISST version 2 data product was used to capture this extreme climate event in the ocean. Throughout the training program, a series of deep learning techniques were systematically explored in an effort to construct a robust statistical framework for the prediction of marine heatwaves in the Indo-Pacific region. The iterative experimentation was in neural network configurations. This process not only underscored the adaptability of neural network algorithms but also aimed to enhance the accuracy and reliability of the statistical framework for marine heatwave prediction.

What applications of the training received do you envision at your parent institution?

I am fully committed to transferring the knowledge and skills gained during the training program to my colleagues back at my parent institute. We are enthusiastic about leveraging the skills and knowledge acquired during the training program to contribute to both my parent institute through a high-quality research publication. Under the guidance of my parent supervisor, Prof.

Mukunda Dev Behera, our team is consistently engaged in expanding our scientific footprint on the global stage. I am enthusiastic about the prospect of applying these advancements collaboratively within our institute for the benefit of our research community and the broader scientific community at large.

Please provide your comments on the Fellowship Programme
I am incredibly grateful for the opportunity to have participated in the POGO-SCOR Fellowship Programme 2023.

Report from Host Supervisor:

Please provide your comments on the performance of the trainee.
I would like to express my complete satisfaction with the performance of Ms. Roma Varghese throughout the duration of the training program. Her dedication, expertise, and commitment to the tasks at hand were evident and greatly contributed to the success of the program.

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.
We are now preparing for a MoU proposal between JAMSTEC and IIT Kharagpur. The insights gained from the training program, particularly in utilizing advanced AI techniques for climate data processing and analysis, align perfectly with our shared goals. We believe that incorporating the outcomes and expertise gained from this training program into our collaborative efforts will further strengthen our proposal.

Please provide your comments on the Fellowship Programme.
The POGO-SCOR Fellowship Programme presents an outstanding opportunity for early-career oceanographers from developing countries to gain international research exposure. The program not only offers advanced training opportunities in marine science and technology but also serves as a platform for fostering global collaboration in oceanographic research. I genuinely appreciate the significance of such training programs in contributing to the professional development of aspiring scientists. The prospect of being part of the POGO-SCOR Fellowship Programme is truly exciting, and I look forward to the possibility of contributing to and benefiting from this enriching experience.

Report from Fellow: Tobias Sérvulo

Country of Origin: **Host Country:**

Parent Supervisor and Institute: Camila Negrão Signori, University of São Paulo, Brazil

Host Supervisor and Institute: Ana Luzia de Figueiredo Lacerda, Laboratorie d'Oceanographie de Villefranche, France.

Training topic: Oceanographic instrumentation and DNA-metabarcoding techniques applied to the mediterranean plastisphere.

Training dates: 3rd November – 11th December 2023

Please provide a brief description of activities during the training period.
During this training, a considerable range of activities were employed to investigate the diversity and characteristics of the communities associated with plastic debris, the so-called 'plastisphere', in the Mediterranean Sea, with a focus on fungi. The activities included DNA extraction of the plastisphere, Polymerase Chain Reaction (PCR), Image analysis, characterization of plastic particles, and basic training on DNA metabarcoding analysis. Succinctly: after DNA extraction, PCRs were performed to amplify the Internal Transcribed Spacer (ITS2), which targets specifically fungal groups. The purity of the extracted DNA was assessed using a Biodrop. Additionally, electrophoresis gel analysis was conducted to verify the efficiency of both DNA extraction and PCR products.

Furthermore, the training extended to activities such as the creation of PCR programs on a thermocycler, and the intricacies of primers' design. In addition to these molecular techniques, plastic samples underwent a comprehensive categorization process, classifying them according to type (film, foam, fragment, line, and pellet), colours, and size class (1-5 mm in micro, and 5 - 200 mm in mesoplastics). Subsequently, individual plastics underwent microscopic imaging to obtain the particle's area, which will be correlated with the number of plastisphere individuals per plastic. In addition, spreadsheet management of oceanographic campaign data were also conducted. This approach provided a holistic understanding of the molecular and physical attributes of the Mediterranean plastisphere, contributing to a comprehensive investigation of plastic-associated microbial communities.

What applications of the training received do you envision at your parent institution?
The occurrence of the plastisphere in the oceans, as a recent and relatively unexplored phenomenon, holds immense potential for research, especially in Brazil, where very few initiatives had explored this ecosystem. My intention is to use the training received on both molecular techniques and plastics characterization, to develop a robust approach for investigating the broad impacts of marine plastic pollution.

The laboratory skills acquired, including DNA extraction from environmental samples, creation and use of PCR programs, design of specific primers, image analysis and classification of plastic debris provide a versatile toolkit applicable not only to plastisphere-related research but also to a broader spectrum of molecular biology and plastic pollution researches. This adaptability is particularly valuable for my ongoing Masters project, which focuses on investigating pelagic microbial communities on the Antarctic Western Peninsula.

Furthermore, the interdisciplinary nature of the training will generate long-term results, beyond our immediate research goals. I am honoured to have been invited to contribute as a co-author in an article resulting from the research conducted during the training, strengthening the collaboration between the University of São Paulo, Brazil, and the Sorbonne University, France. In addition, I had the opportunity to improve my French speaking skills, which I hope to apply when attending scientific meetings and creating new partnerships, while representing my parent institution.

In essence, I am excited about the transformative potential of this training in my career, especially dynamize research initiatives in my parent institution. I look forward to integrating these skills into the ongoing projects of the research group I am part of.

Please provide your comments on the Fellowship Programme

As the training reached to an end, its impacts are long-term, shaping the trajectory of my professional and personal journeys for the years to come. This experience has provided me with valuable insights, inspiring my aspirations to the next steps after obtaining my Master's degree. I am now committed to pursuing a PhD, fuelled by the newfound clarity and passion for research that this opportunity has given me. This training has not only enriched my academic perspective but has also created meaningful collaborations between my parent institution and the host institution. These collaborations are poised to contribute significantly to the advancement of knowledge in our research fields, specifically marine microbiology.

I extend my deepest gratitude to the POGO-SCOR Fellowship Program for making this extraordinary experience possible. Without their support, none of these opportunities for personal and professional growth would have been materialized. The impact of this fellowship resonates profoundly, and I am sincerely thankful for the doors it has opened and the new perspective it has brought to my academic and research goals.

Report from Host Supervisor:

Please provide your comments on the performance of the trainee.

I was pleased to have this trainee in our laboratory. The student conducted all the planned activities during the training, always being proactive and solving unexpected issues that appeared (e.g., seeking lab material to be replaced, preparing reagents, creating figures to better illustrate the ongoing activities before the weekly group meeting, etc.). A total of 66 plastic samples were analysed in different aspects regarding the physical characteristics of plastics, as well as the diversity of plastic associated microbes. I consider this such a great achievement, and it was only due to the trainee's hard work. In addition, the trainee was very friendly with everyone in the lab and created a nice atmosphere in the workplace.

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.

During the training, a robust dataset was generated, and final analyses are being conducted (DNA sequencing, and Spectroscopy – FTIR) before we can write a scientific article focused on the plastisphere fungi in the Mediterranean Sea. The trainee was mainly responsible for generating this data and will collaborate as a co-author on the upcoming manuscript. In addition, after the training, I was invited to contribute to the student's Master's thesis and the scientific paper expected to originate from it with the Brazilian team at the University of São Paulo. This reinforces that the collaboration created for this training has been strengthened and may generate the opportunity for the exchange of new students and joint research initiatives.

Please provide your comments on the Fellowship Programme.

I consider the POGO-SCOR Fellowship Programme a great opportunity for early-career researchers to learn and improve their skills in Ocean Sciences. In addition, it is an amazing opportunity for the host institution to receive a trainee from abroad, with all the multiculturalism and multidisciplinarity it involves. This knowledge exchange is very important to improve scientific activities. Moreover, the application process and the tasks to be conducted after the scholarship's acceptance were very smooth, and the POGO team sorted out all travel-related issues. I highly recommend this Fellowship Programme to all early-career researchers

eligible. I would like to thank the POGO-SCOR program for providing this amazing opportunity to our laboratory at Sorbonne University.

Report from Fellow: Toufik Zeghloul

Country of Origin: **Host Country:**

Parent Supervisor and Institute: Nabil Bouflih, National Research Center for the Development of Fisheries and Aquaculture, Algeria

Host Supervisor and Institute: Matthias Wolff, Leibniz Centre for Tropical Marine Research, Germany

Training topic: Trophic modelling of Algerian coastal ecosystem.

Training dates: 29th February - 29th April 2024

Please provide a brief description of activities during the training period.
During my internship at ZMT, I participated in a comprehensive set of activities designed to enhance my skills in trophic modeling and marine ecosystem analysis. The main activities included:

- **Trophic Modeling:** Guided by the references provided by Mr. Matthias and Mr. Giovanni, I delved into the construction and calibration of trophic models, focusing on coastal ecosystems in Algeria. This included data collection, processing, and integration into different modeling frameworks.
- **Technical Training:** I received hands-on training in the use of advanced software and tools for ecological modeling and data analysis, which significantly enhanced my technical competence.
- **Collaborative Research:** Through the data I obtained and the weekly discussions we had, I collaborated with Mr. Matthias to develop a prototype model. We are currently in the process of finalizing this model for a scientific publication.

What applications of the training received do you envision at your parent institution?
The training received at ZMT has equipped me with valuable skills and knowledge that I envision applying at the National Research Center for the Development of Fisheries and Aquaculture (CNRDPA) in Algeria:

- **Establishment of a Modeling Department:** Inspired by the methodologies learned at ZMT, I plan to establish a dedicated modeling department at CNRDPA. This department will focus on developing and applying trophic models to assess and manage our coastal fisheries sustainably.
- **Enhanced Research Capabilities:** The advanced techniques and tools I mastered will enhance our research capabilities, enabling more accurate and comprehensive assessments of fishery resources and ecosystem health.

- **Capacity Building:** I intend to organize training sessions and workshops to share the knowledge gained with my colleagues, fostering a culture of continuous learning and professional development within our institution.
- **Collaborative Projects:** The connections established with ZMT will facilitate future collaborative research projects, allowing us to address complex marine science challenges through a synergistic approach.

Please provide your comments on the Fellowship Programme.
The POGO-SCOR Fellowship Programme has been an invaluable experience, providing a platform for young researchers like myself to gain advanced training and build international networks. My key observations are:

- **Quality of Training:** The programme offers high-quality, hands-on training from leading experts in the field, significantly enhancing participants' research skills and knowledge.
- **Collaborative Opportunities:** It fosters meaningful collaborations between institutions, which can lead to long-term partnerships and impactful research outcomes.
- **Professional Development:** The exposure to different research environments and methodologies is crucial for the professional growth of young scientists, preparing them to tackle global marine science challenges effectively.

I am profoundly grateful to POGO and SCOR, Mr. Matthias Wolff, Mr. Giovanni Romagnoni, and all the wonderful people at POGO and ZMT who made this experience possible. Your support and mentorship have been instrumental in my development as a researcher, and I look forward to applying what I have learned to contribute to the sustainable management of marine resources in Algeria.

Report from Host Supervisor:

Please provide your comments on the performance of the trainee.
Toufik is performing well. He has digged deep into the topic of trophic modeling and is busily collecting information for model construction

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.
I assume that the modeling of the fished coastal system of Algeria – the research Toufik is concentrating on - is something that opens a venue for long-term collaboration between our centers. There are many modeling tools for this purpose and fishery monitoring and assessments on the population and ecosystem level is a broad research area for many years of collaboration. I could imagine short term courses at the parent institutions, for which experts from ZMT travel to Algeria to join the experts from the parent institution for jointly conducting training courses and developing bilateral research projects.

Please provide your comments on the Fellowship Programme.
I know the POGO-SCOR programme for years and believe that it makes a difference by enabling the establishment of fruitful collaborations between the partners and by helping young professionals to deepen their knowledge in their research area of interest.

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Summary of fellowship: Kranthikumar Chanda

Country of Origin: **Host Country:**

Parent Supervisor and Institute: Smitha B.R., Centre for Marine Living Resources and Ecology, India

Host Supervisor and Institute: Haris Kunnath, Commonwealth Scientific and Industrial Research Organisation, Australia

Training topic: Application of Underwater acoustics for mesopelagic fish identification and Biomass estimation in tropical ecosystems

Training dates: 1st January – 4th March 2024

Summary of activities during the training period.

Underwater acoustics techniques are used to assess the mesopelagic fish habitat of the Arabian Sea. I am working on underwater fisheries acoustics, especially on the volume of backscattering, and mesopelagic fish identification towards resource assessment and habitat mapping of the mesopelagic realm of the South Eastern Arabian Sea (SEAS). The South-Eastern Arabian Sea is a unique system in the global ocean, driven by various complex physical processes, biogeochemical impacts and rich and diverse biota in the pelagic, mesopelagic and demersal realms. Under the varying climatic conditions, Arabian Sea being a sensitive basin in terms of ecosystem issues, viz; the intensifying Oxygen Minimum Zone and the associated change in occurrence of the fishes and like resources, the quantification of the living resources is important. Underwater Acoustics being an emerging technique in the field, and taking into consideration of the large scope of the work in India, my research objective is framed to explore sound data (multi-frequency Echo sounder 38 kHz, 120 kHz and 200 kHz- EK60). During this POGO-SCOR fellowship, I carried out fisheries acoustic techniques like data calibration, preliminary data processing methods at CSIRO, Hobart.

The objective of my training was to gain knowledge and expertise relevant to an ongoing project at CMLRE, MoES, India, titled "Application of Underwater Acoustics for Mesopelagic Fish Identification and Biomass Estimation in Tropical Ecosystems." Given CSIRO globally recognized expertise in fisheries acoustic studies since many years. Fisheries acoustic survey was conducted at South Eastern Arabian Sea (SEAS), cruise 344 using FORV Sagar Sampada on 07-17 September 2015. The multi-frequency acoustic data was collected by employing Simrad EK-60, which is a split beam echo sounder at different frequencies: 38, 120, and 200 kHz. The post-calibration methods such as (EK80, ESP3 and Echoview software's) were carried out at CSIRO, which is most important for correcting volume backscatter data for analysis. The scientific computations of SONAR equations for calculating volume backscatter strength Sv and Target Strength (TS) using MATLAB programs and also fisheries acoustic methods were carried out, such as Area backscattering (ABC) and NASC for mesopelagic zone pelagic to estimate fish biomass.