Report on the 2021 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 more than 180 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 steppingstone 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). 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 2021

The announcement for the 2021 POGO-SCOR Fellowship Programme was posted on the 17th March 2021, with a closing date of 30th April, subsequently extended to 14th May 2021.

A total of 42 valid applications were received this year, with exactly half submissions from male and female candidates. Applications were received from 16 countries in Africa, Asia and Latin America. Candidates selected host institutes located in all continents, except Africa (Figure 1).
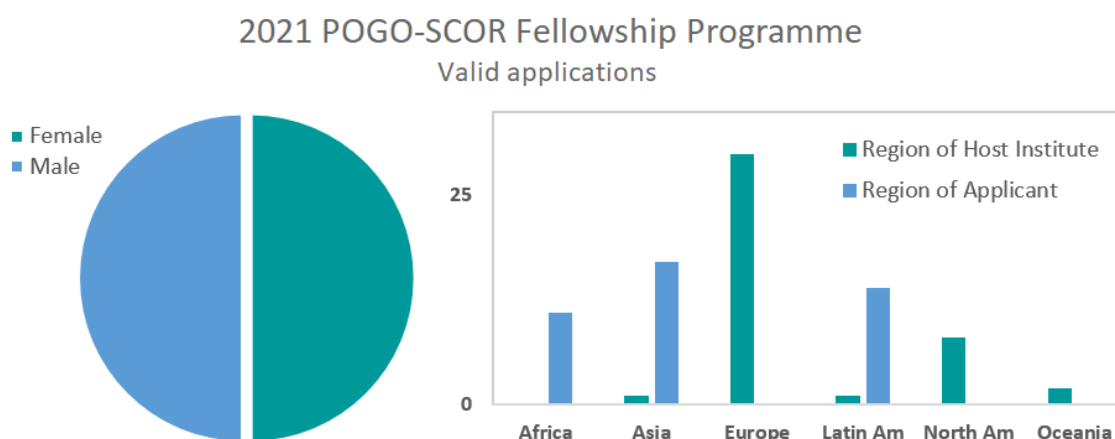

Figure 1 – Gender and regional distribution of valid applications to the 2021 POGO-SCOR Fellowship

programme.

Applications were evaluated independently by a committee of four representatives of SCOR and POGO Secretariats 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, fitting of application to the 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 were then totalled and the budget for top-ranked applicants 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 or trainee, the supervisor at the parent institute and the supervisor at the host institute) have been requested to contribute to a short report at the end of the training period.

Reports from 2021 Fellows and their Host Supervisors

Report from fellow: Carolina Gramcianinov

Country of Origin: 🇧🇷   **Host Country:** 🇩🇪

Parent Supervisor and Institute: Dr Pedro Leite da Silva Dias, University of São Paulo, Brazil.
Host Supervisor and Institute: Dr Joanna Staneva, Institute of Coastal Systems Analysis and Modeling - Helmholtz Centre Hereon, Germany.
Training topic: Integrated wave modelling and observation system in the South Atlantic Ocean.
Training dates: 1st September - 30th November 2021

Please provide a brief description of activities during the training period.
At the begging of my fellowship, I was trained on data analysis, covering data acquisition, processing, and visualisation. I used different data sources, such as buoys, satellites, and vessel measurements of parameters, such as significant wave height (swh), mean wave direction, peak period, and wind speed. I learned how to produce quality control checking, suitable graphical presentation, etc. As a second part of the internship, I was trained to set up and run the wave model (WAM). Several sensitivity tests were done to produce model outputs that better represent the waves of the Brazilian coast. In this step, I learned how to make model validation against in-situ and satellite observations, error metrics, etc. Finally, I learned how to perform the data assimilation of swh altimetry data into the model. In this step, all what I had learned so far were combined, since each observation data source need to be checked before being assimilated into the model. Ongoing work is assessing the results and writing a publication. The manuscript will present the results of the high-resolution wave hindcast for the Southeastern Brazilian Coast and the impact of data assimilation, with focus on extremes event.

Besides that, I was able to interact with many researchers in the field of data analyses, modelling and data assimilation, increasing my networking for future works and collaborations. I have learned a lot about the upcoming on methods and approaches on costal research from attending the Modelling and Data Assimilation department (KSD) weakly meeting and Institute of Coastal Systems (KS) weakly seminars. I also had the opportunity to participate as a guest on the Institute's retreat, which was a 3-day event dedicated on the state-of-the-art of coastal system research.

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

As a result of this internship, we intent to produce one of the first high-resolution wave hindcasts with data assimilation for the SE Brazilian coast. The data will be available to the scientific community and hopefully will be used by other research groups. This effort is essential to building up an open access operational wave product that focuses on the increase in the synergy between observation and modelling. I intent to support the development of this wave operational system at the University of Sao Paulo, engaging other students and researchers that may be interested in combining model and observational data to improve the coastal hazard understanding and prediction in Brazil. In the future, this continuous effort can help in the training of students and researchers to support the maintenance of the system and can improve the development of new methods of assimilation to use better the Brazilian observational network.

Please provide your comments on the Fellowship Programme.

The fellowship brought to me not only practical training but also professional and personal experience that surely improved my skills as an early-stage researcher. Since the KSD department works with state-of-art costal models observational data and approaches for their integration into advanced end-products, I was able participate in many scientific discussions that enrich my perception on these subjects. Regarding the waves, I worked closely with Dr. Arno Behrens, who is one of the current developers of open sources WAM. Dr. Anne Wiese and Dr. Marcel Ricker, who work with wave model parametrization improvements and operational production, also supported me all the time. I received routines for pre- and post-processing of the model and observation data, as well as the codes for wave model and data assimilation. During my internship I was able to produce my own toolkit needed to start working independently. Dr. Joanna Staneva supervised me, following every step and included me in all department activities. It was an amazing experience.

Report from Host Supervisor: Dr Joanna Staneva, Institute of Coastal Systems Analysis and Modeling - Helmholtz Centre Hereon

Please provide your comments on the performance of the trainee

Carolina Barnez Gramcianinov showed a remarkable understanding of different methods for data analyses, wave-modelling and assessing the synergy between different data. She worked in learning how to set-up independently the wave model for the SE Brazilian coast using nested-modelling approach, and produce combined analyses of the wave model simulations with satellite based products and in situ measurements. She has proven to be a responsible person who can successfully followed the Internship plans and was able to implement her tasks carefully and successfully. Carolina carried out every aspect of her work to the highest possible standard.

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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.

Collaboration between HEREON and University of São Paulo in Brazil in the field of operational oceanography, wave data analyses and data assimilation will be pursued. In addition of producing join papers, Carolina, together with scientists from Hereon, will work together on implementing the downscaled system and in the training early career researchers in using the already developed in the frame of POGO-SCOR fellowship toolkits.

Please provide your comments on the Fellowship Programme.

During the Fellowship Carolina was trained on wave and wind data analyses, coastal modelling, and synergies between different types of observations and model simulations. This training gave her unique opportunity to learn and follow closely activities in the framework of coastal ocean operational system running at Helmholtz Centre Hereon and initiate her own developments. The results produced within and beyond the lifetime of this fellowship can be of great value to both scientical and coastal management and decision makers, particularly on Brazilian coast.

Report from Fellow: Stella Patricia Betancur Turizo

Country of Origin: **Host Country:**

Parent Supervisor and Institute: Dr Natalia Burgos Uribe, Center for Oceanographic and Hydrographic Research of the Caribbean (CIOH), Colombia
Host Supervisor and Institute: Dr. Jose Martin Hernandez Ayon, Instituto de Investigaciones Oceanologicas, Mexico.
Training topic: Biogeochemical parameters analysis at Antares Cartagena station and its climatic variability in the Colombian Caribe region.
Training dates: 11th October – 11th December 2021

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

The training was focused on the application of laboratory practices and management of autonomous measurement equipment (Example: MinFet for pH measurements in the ocean). For those of us interested in the implementation of pH measurements, Total Alkalinity (AT) and Dissolved Inorganic Carbon (DIC) measurements, it is not only enough to follow the protocols of Dickson et al. (2007), but also to understand the approach and small details for each variable and all the instruments behind each measurement, so that we can measure with precision and accuracy.

For the first weeks, I learned how to measure TA using a titration automatic system, DIC by a coulometric instruments and pH by a potentiometric closed cell system, using the laboratory equipment of Dr. Hernández-Ayón, all of these under the guidance of qualified personnel in each parameter. After the instruction I was allowed to apply what I had learned and assess my skills until I achieved precision in the measurements and finally, I was able to read my own samples.

In the final weeks of training, I learned how to set up by my own a TA and pH measurement system. The first variable using a closed manual titration cell and for the second with a close cell. Both system I learned to set up it was with similars instruments that I have in the CIOH

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laboratory, which implied greater care and control of each stage of the process, since we do not have an automated system of measurement. This was the most important thing about my stay, seeing that despite the technical limitations of my laboratory, I can measure these variables and contribute data to the international community.

In parallel to the process of laboratory measurements of the mentioned variables, I had the support of Dr. Orion Norzagaray, who is part of the team of experts in Dr. Hernández's laboratory, and with his advice, I learned to manage and maintain the equipment of pH measurement (MinFet) acquired with resources from the NANO-DOAP project. Dr. Norzagaray shared his experience in the handling of this type of sensors and the application of good care practices and handling of the data generated by these instruments, through the application of verification and calibration protocols. Likewise, I work in private meetings with Dr. Hernández-Ayón, with the aim of formulating a joint project that allows us estimate a climatological TA and pH baseline from satellite data. These results will allow us to understand the Caribbean basin and focus monitoring efforts on those areas of significant variability.

What applications of the training received do you envision at your parent institution?
Everything I learned was focused on the implementation of TA and pH measurements in the CIOH laboratories, as well as the correct installation of the equipment acquired by the project for the generation of quality pH time series.

We hope to formulate a joint research project and continue with the support and advice of Dr. Hernández-Ayón's laboratory, contributing to the global data of the variables of the carbonate system.

Please provide your comments on the Fellowship Programme
This type of program allowed me to work in a laboratory of high scientific quality, with experts in the study of the carbonate system in the oceans. Without this scholarship, I would not have had the opportunity to gain skills and knowledge in these measurements.

In our countries, we always have financial limitations that prevent us from having the resources to visit laboratories like these and to be able to interact with experts on topics of interest such as my research stay. Presence is important, because there are exercises and instructions that cannot be carried out virtually and that merit direct physical interaction. For this reason, I hope that this type of scholarship will continue to develop.

Report from Host Supervisor: Dr. Jose Martin Hernandez Ayon, Instituto de Investigaciones Oceanologicas

Please provide your comments on the performance of the trainee.
Stella did a very good job. During this period Dra. Stella worked extensively on three projects. The training was the first mainly focused on the best laboratory practices and management of autonomous measurement equipment "MinFet for pH measurements in the ocean". We teach her the protocols for preparation before and after to go to the sea. She also learned the protocols and details of discrete samples used for pH validations of autonomous measurements. The of these was to develop techniques for the assessment the Total seawater alkalinity and pH to get insitu values for seawater measurements but also for calibrations purpose. The third was to set up a system and the methodology used for total alkalinity measurements in the laboratory.

In my opinion Stella did and excellent performance and I'm sure she will do an excellent job in all her endeavours in Colombia and she will get benefit from this fellowship.

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 will further work to comparison for coastal ocean measurements to broader oceanographic and social applications for the Caribbean region. This experience for Stella was an important contribution for collaborate in the project Dynamics of Marine Plankton and Climate Change, which includes the time-series station of Antares. Likewise, Stella and me have a meeting plan with the aim of formulating a joint project that allows us to estimate a climatological TA and pH baseline from satellite data. These results will allow us to understand the Caribbean basin and focus monitoring efforts on those areas of significant variability.

Please provide your comments on the Fellowship Programme.
I´m very pleased with the support from POGO-SCOR for Dra. Stella Patricia Betancur Turizo to be in our laboratory, at the Instituto de Investigaciones Oceanologicas at the University of Baja California, Mexico. My laboratory has a tradition of strong interaction with the Latin-American Ocean Acidification Network (LAOCA). We have developed and implemented a laboratory with infrastructure for CO_2 measurement in coordination with the LAOCA network. I strongly support such international capacity building efforts and especially support the POGO-SCOR efforts. The training of this young professional will serve to spread the knowledge of an important technology.

Report from Fellow: Cristhian Asto

Country of Origin: [Peru flag]   **Host Country:** [France flag]

Parent Supervisor and Institute: Dr Dimitri Gutiérrez Aguilar, Instituto del Mar del Peru
Host Supervisor and Institute: Dr Anthony Bosse, Mediterranean Institute of Oceanography & Mediterranean Institute of Oceanography, France.
Training topic: Glider training for coastal monitoring in the Peruvian upwelling system.
Training dates: 26th January – 25th February 2022

Please provide a brief description of activities during the training period.
The training addressed different topics ranging from theoretical and practical about the management and real time data transfer gathered from automated underwater vehicles (also known as gliders). Over the 1-month training period at the Mediterranean Institute of Oceanography (MIO, Marseille, France), I managed to replicate the good practices established by the experts of the OceanGlider program endorsed by UNESCO (https://github.com/OceanGlidersCommunity). For instance, Dr. Anthony Bosse provided an introduction regarding all the past and current deployments in the Mediterranean Sea made possible by French National Research Center (CNRS) since 2007, as well as the piloting and

maintenance database tools. In addition, we checked two of the CNRS's gliders that were in operation at sea and observed the data sent since the beginning of the mission. Moreover, Dr. Anthony Bosse gave recommendations to optimize the data collected by the gliders that my institution had in operation at that time. Finally, we were able to make use of the tools developed by the glider community for the real time data transfer (edition of json file for the metada and ftp transfer to the Global Data Assembly Center Coriolis) that are highly valuable for monitoring the ocean.

What applications of the training received do you envision at your parent institution?
The Eastern Pacific is a complex region with highly variable conditions. The Peruvian Marine Research Institute (IMARPE) is trying to establish an operational monitoring network using state of the art instruments such as gliders. Currently, IMARPE has 4 operational gliders that will be used to that purpose. This training will help to better operate and automatize the data transfer sent in real time by those instruments. Furthermore, having learned different practices recommended by Dr. Anthony Bosse, our gliders will be optimized to collect high quality data and share them in real time with Coriolis. This will make our activity visible and our data open, as well as available for assimilation in operational forecasting models and reanalysis. Finally, all the acquired knowledge will be passed on to my colleagues at IMARPE.

Please provide your comments on the Fellowship Programme
This fellowship programme allowed me to travel and learn more about the operation of gliders. I am very grateful to be given the opportunity to stay for a month in France and learn from an expert in the field at MIO, Dr. Anthony Bosse. I believe this Fellowship Programme is an excellent initiative for young scientists who want to develop an expertise in ocean sciences.

Report from Host Supervisor: Dr Anthony Bosse, Mediterranean Institute of Oceanography & Mediterranean Institute of Oceanography

Please provide your comments on the performance of the trainee.
Mr Cristhian Asto has been a very motivated and skilled trainee. Being in charge of technical duties with a glider being at sea, Cristhian has proved to be completely capable of handling his everyday commitments with the ongoing glider activity of his institution, and learn and apply new knowledges to expand the data stream. Communication was very easy since Cristhian is proficient in English. To conclude, I greatly appreciated hosting Mr Cristhian Asto at MIO, he was an outstanding trainee.

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, indeed this exchange will be the starting point of a future collaboration. With the co-supervision by colleagues in France and Peru, the trainee has been endorsed into a French PhD program. It will allow him to spend 18 months in France in the next 3 years in order to prepare for a PhD degree. The trainee will spend more time at MIO with me to develop scientific questions linked to glider data collected off Peru. Moreover, we stay in touch in order to keep sharing best practices around the data stream from the glider, as well as the maintenance data base that will become an open tool in the framework of H2020 GROOM-II project (design of a future European glider infrastructure, PI L. Mortier LOCEAN, France).

Please provide your comments on the Fellowship Programme.

The POGO-SCOR fellowship was very useful for me in order to start an important collaboration with Mr Cristhian Asto. It was very positive from both the scientific and human aspect.

Report from Fellow: Pranav Pulukkayi

Country of Origin: [India flag]   **Host Country:** [UK flag]

Name of Supervisor (Parent Institution): Dr Grinson George, Central Marine Fisheries Research Institute, India
Name of Supervisor (Host Institution): Dr Shubha Sathyendranath, Plymouth Marine Laboratory (PML), UK
Training topic: Use of sentinel satellite data for mangrove mapping and conservation.
Training dates: 20th February – 20th May 2022

Please provide a brief description of activities during the training period.
Geospatial mapping of mangrove patches along selected Indian coastal states is one of the major objectives of my ongoing PhD programme in India. Mangroves in Indian states are not scientifically mapped due to their scattered locations, vast coverage, and lack of expertise in the field. The major objective of my visit to Plymouth Marine Laboratory (PML) with the support of the POGO-SCOR Fellowship was to learn new scientific tools and techniques to standardise a satellite-based methodology for mangrove mapping and monitoring, to achieve one of the objectives of my PhD work, and to facilitate my long-term goal of working on mangrove conservation.

By availing the POGO-SCOR fellowship, I was able to execute the following activities:
2.4.1. Sentinel-2 satellite-based mapping of Indian coastline states: Sentinel-2 satellite-based mapping of two Indian coastal states, viz., Kerala and Andhra Pradesh, was initiated before the fellowship tenure started. This method of classification was suggested by Dr Shubha Sathyendranath; my supervisor at PML. Based on this, and with help from experts at PML, all the contiguous mangrove patches in these states were mapped and delineated using a random forest classification algorithm using the software package SNAP, during my sojourn at PML. To confirm the correctness of the methodology and the outputs generated, a presentation on "Delineating mangrove patches along the coastal regions of Kerala and Andhra Pradesh using Geographical Information System, satellite data and field validation" was given at PML during the monthly meeting of habitat mapping experts at PML on 30/03/2022. The methodology and results were discussed within the group and improved by incorporating their comments and suggestions.

2.4.2. Artificial intelligence (AI) Machine Learning (ML) method for the classification: Katie Awty-Carrol, Scientist at PML, introduced me to AI and ML-based methods as a promising methodology for coastal habitat mapping. Remote Sensing and GIS Software Library (RSGISLib) and Atmospheric and Radiometric Correction of Satellite Imagery (ARCSI) were the two python packages recommended for conducting the classification. Accordingly, ARCSI was used for the atmospheric correction of Sentinel-2 and Landsat-8 data were used with the PML software library RSGISLib for further classifications. I learnt these techniques with the support of Katie

Awty-Carrol, Emma Sullivan and Dan Clewley, scientists in the remote sensing lab at PML. The method was tested for mangroves in the Coringa wildlife sanctuary (India), the validation coordinates of which were gathered during earlier field surveys.

2.4.3. Attended the training course on 'NEODAAS AI for Earth Observation' during 3-4th May conducted at PML: Students from Exeter university also participated in the two-day programme. The programme gave me an insight into various AI-ML techniques used with Earth observation satellite data, such as Convolutional Neural Networks for Land Cover Mapping and also the MAGEOHub for the bulk data process.

2.4.4: Techniques learned: I learnt various tools and techniques such as python packages (RSGISlib and ARCSI) and Jupyter notebook which could be applied for the classifications as well as visualisation of the data generated as part of my PhD research. I also familiarised myself with the Linux operating system, Python packages for plotting scientific figures and making plots using the Jupyter notebook.

2.4.5: The skill of scientific writing: The skill of scientific writing is another important aspect that I learned from Dr Shubha. Under her efficient guidance, I was able to write the main chapters of PhD thesis which I would not have been able to complete otherwise.

2.4.6. Proposal submitted: I was able to contribute inputs to a proposal on mangrove restoration as a measure to protect the coastal population of Kerala from storm surges and flooding, and consequent exposure to the population from water-borne diseases. The project proposal was submitted to a funding agency by PML, with the help of James Lord, fundraiser at PML. This, if funded, could be an extension of my ongoing outreach programme "Mangrove Aided Restoration of Kerala coastline at Selected sites (MARKS) funded by Trevor Platt Science Foundation (TPSF)", and will facilitate future collaborations with Dr. Shubha and colleagues in the Remote Sensing Group at PML.

What applications of the training received do you envision at your parent institution?
The new techniques for mangrove mapping that I learned from PML during the fellowship period can be used to map the entire mangrove patches in India. Central Marine Fisheries Research Institute (CMFRI), the parent institute at Cochin, would be willing to facilitate me in extending the study with the high-performance computing (HPC) capabilities available there. The methods for processing Sentinel-3 and Sentinel-2 can be utilised to integrate my studies with the fisheries data, because CMFRI is the institution in charge of overseeing marine fishery of India.

Please provide your comments on the Fellowship Programme.
POGO-SCOR Fellowship is a prestigious fellowship which gave me a great opportunity to advance my career. It helped me to learn and update my skills and techniques. People from developing countries would always benefit from international exposure, training, and interaction with experts and students. Throughout the period, POGO-SCOR officials have been very cooperative and helpful. Sincere thanks to Sofie, Laura, Karolina and Lica.

Report from Host Supervisor: Dr Shubha Sathyendranath, Plymouth Marine Laboratory

Please provide your comments on the performance of the trainee.

Pranav made the most use of his time here at PML. He worked hard and learned a lot. He interacted with many experts here in PML on mangrove mapping and on artificial intelligence (AI) techniques. I understand that the work he has done in PML will figure prominently in his PhD thesis. I received good reports from his other colleagues at PML, including Emma Sullivan and Katie Awty-Carroll. Pranav also made an effort to learn about English culture and enjoyed outdoor activities in the weekends, including sightseeing, going for walks and playing cricket with regional teams (where I understand his talents were very much appreciated). Seeing how useful his visit was and the relevance of his work for some of our ongoing projects, I extended his visit by one month using funds from one of my projects. The work he is engaged in, that of mapping mangroves using satellites, combined with outreach activities to inform and educate the general public on the value and importance of mangroves, I believe that his fellowship will have a long-lasting impact.

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.
From my side, I would certainly be interested in continuing the collaboration with Pranav and with CMFRI. In fact, through the Trevor Platt Science Foundation, he now has a small outreach project on mangroves, that he is executing with support from CMFRI and other institutes.

I do not know what his position at CMFRI would be once he completes his PhD. I trust that CMFRI also values his talents and his expertise as highly as I do, and that his association with CMFRI will continue, in one form or another, after completion of his PhD.

Please provide your comments on the Fellowship Programme.
The long-standing nature of the programme is a testament in itself on its quality and the need that it fills. My experience with the programme in general, and with Pranav in particular, has been very positive. It is a valuable mechanism for facilitating hands-on training and promoting collaborations between countries and between institutions engaged in ocean observations. I sincerely hope that POGO and SCOR will continue this programme. Thank you very much for giving us the opportunity to host Pranav. I also thank all at the POGO Secretariat, for their unfailing and courteous help and support throughout the implementation of this fellowship.

Report from Fellow: Dava Amrina

Country of Origin:

Host Country:

Parent Supervisor and Institute: Dr Nelly Florida Riama, Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG), Indonesia.
Host Supervisor and Institute: Dr Janet Sprintall, SCRIPPS Institution of Oceanography, USA.
Training topic: Karimata Strait Variability in relation to Northeasterly Cold Surges and their Impact on Regional Rainfall.
Training dates: 31st May - 30th July 2022

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

The activity during the training was to conduct research on climate variability in the Karimata Strait area through the identification of the Cold Surge index. A cold surge index is chosen as the averaged 925-hPa meridional wind between 110° and 117.5°E along 15°N. A cold-surge event occurs when this index exceeds 8 m/s. Based on the classification of the cold surge index, I then classified it according to the period the index occurred. Based on these data, I analyzed parameters related to the occurrence of the cold surge index such as rain, SST, salinity, ocean current, and wind. Each was then analyzed, especially at the peak of the season in the NDJF period, carried out a composite so that the average during the peak period and anomalies were obtained.

The research process was carried out in full for two months, with the first stage identifying the parameters to be analyzed. Then the process of data preparation and data processing. During the training process, I have a regular schedule of discussions and face-to-face meetings with Dr. Janet Sprintall every week to find out the progress of data processing and data analysis results. From the results of face-to-face discussions, I gained new insights about the research process, the process of preparing data for research, processing data carefully to obtain optimal analysis results, and soft skills in solving problems in research. Of course, during the two-month training period, I got many benefits, especially in hard skills and soft skills which I can share with colleagues in my country, BMKG Indonesia.

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

I received a lot of experience from training for two months at UCSD, is that it is very important to consider the prediction of cold surge events. Especially in weather prediction and climate analysis in the long term. The results of the research later, I will write in detail and under the supervision and guidance of Dr. Janet Sprintall as a scientific report for my agency. These results can be used as information and input for the development of weather predictions at the BMKG and input for office leaders in making decisions regarding seasonal predictions in Indonesia.

I also shared my experience of training at UCSD with colleagues in my agency through Online Group Discussion activities which were held after I returned to Indonesia. I want to give motivation that apart from doing routine work, we also need to develop ourselves through independent training, through courses, and the POGO-SCOR Programme is one of the facilitators who can provide this opportunity. Of course, this training is not only beneficial for me personally but also for my co-workers, colleagues, and the institution where I work.

3) Please provide your comments on the Fellowship Programme.

An opportunity and this training was an excellent opportunity for me to expand my scientific career. First of all, I had the opportunity to work with Dr. Janet Sprintall, who already has a lot of experience in ocean-atmosphere and ocean observation. I also had an opportunity to visit and become a part of the Scripps Institution of Oceanography (SIO), UCSD which is the best university with oceanography majors in the world. I got many experiences to join student exchange activities and also make discussions for research and knowledge. Being under the supervision of Dr. Janet Sprintall, I learned a lot about how ocean observation is very useful, especially in the development of weather predictions in the Indonesia region. I was able to use the tools to make some analyses based on observation data (temperature, wind, precipitation, salinity, and ocean currents) and organize it into Interesting and useful information for the

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operational forecast. Moreover, besides developing hard skills, I also learned about soft skills to get to know other cultures in different weather conditions in my country.

Report from Host Supervisor: Dr Janet Sprintall, SCRIPPS Institution of Oceanography

Please provide your comments on the performance of the trainee.

It was a pleasure to work with Dava during her POGO fellowship visit to SIO in June-July 2022. Ms. Amrina had a good understanding of the research goals and applied herself diligently to the problem. During her visit to SIO, we worked on understanding the feedback and influence of Cold Surges as they propagate along the Karimata Strait within the Indonesian seas using modern observational data sets. Dava demonstrated excellent insight in her ability to interpret these oceanographic measurements and, more importantly, to understand their dynamical context. Ms. Amrina is a very hard worker and shows strong initiative. She has both the drive and ambition to study marine science, asking excellent questions and is genuinely inquisitive about the way the ocean works. Dava and I are currently working on a publication to an international, peer-reviewed journal on the research completed during her visit.

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, I expect this exchange to lead to future collaboration with BMKG, Indonesia, Ms. Amrina's parent institution. Examples of how this collaboration may be pursued include future exchange visits and perhaps small workshops concerning scientific topics of mutual interest.

Please provide your comments on the Fellowship Programme.

The POGO-SCOR Fellowship Programme provides an excellent and important opportunity to support visits to host laboratories and research institutions to foster the exchange of ideas and encourage the advance of scientific interests. It's a vital programme that supports the training of early career scientists from developing nations in oceanographic observations and infuse the joy of scientific discovery in these young scientists that working in observational marine science can bring.

Report from fellow: María Mendez

Country of Origin: 🇦🇷   **Host Country:** 🇪🇸

Parent Supervisor and Institute: Gregorio Bigtti, Instituto de Biología de Organismos Marinos (IBIOMAR), Argentina.
Host Supervisor and Institute: Dr Celia Olabarria, Universidade de Vigo, Spain.
Training topic: Effects of increased environmental stress on coastal biodiversity.
Training dates: 30th May – 31st August 2022

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

During the three-month training stay at the Costal Ecology Group (EcoCost, University of Vigo, Spain), I participated in a state-of-the-art mesocosm experiment (at Toralla Marine Science Station, ECIMAT) in which the effect of sustained increase in temperature on different species of bivalves of fishery interest was evaluated. I was also able to learn different techniques for the analysis of physiological response variables in benthic organisms, e.g. feeding and respiration rate. I participated in the processing of samples for metagenomic analysis. All this work was complemented with field trips and data analysis.

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

Working during this time with Dr. Celia Olabarria and the EcoCost team has allowed me to understand different aspects of the effects that changes in fundamental environmental variables (e.g. temperature and salinity) can have on the physiology and survival of marine invertebrate species. The mesocosm experiment provided relevant insights on how future coastal warming scenarios could affect the condition, abundance and distribution of key intertidal species. With the training I have been able to gain experience for complex aquarium experimental designs. Therefore, I will be able to incorporate improvements to different experiments and measurements of physiological variables that I had planned to work on in Argentina. I have also had the opportunity to exchange ideas and points of view with different specialists that will surely enrich my future projects. I will continue my link with EcoCost through future collaborations and I will have the opportunity to replicate what I have learned in my study system: the Patagonian rocky intertidal.

Please provide your comments on the Fellowship Programme.

I believe that the programme provides a unique opportunity to meet and work in prestigious institutions and with highly experienced researchers. The fellowship is a valuable instrument to incorporate new techniques and methodologies as well as to link up with groups working on related topics.

Report from Host Supervisor: Dr Celia Olabarria, Universidade de Vigo.

Please provide your comments on the performance of the trainee.
The performance of the trainee was very good since she participated in all stages of the experiment, including data processing with RStudio. In addition, she helped with other experiments in the field and she always showed initiative and ability to adapt to both mesocosms and field situations, being very proactive and ingenious coming up with new ideas.

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 think the collaboration with María has been very fruitful and set up the basis for a future collaboration. In fact, our mesocosm facilities are available for new experiments with mytilids, organisms on which she has an extensive experience. She could participate and plan experiments with target organisms in our laboratory and we could supervise students together, who could take advantage of Spain-Argentina mobility programs to carry out experiments in both countries. We also could monitor environmental variables such as temperature on intertidal rocky shores in both countries at a temporal large scale following the same protocols.

Please provide your comments on the Fellowship Programme.

This programme is a good initiative to promote training and capacity building and can help to carry out collaboration with different countries in order to establish monitoring programs in different coastal ecosystems. In addition, collaboration between different countries may allow to establish different experimental protocols applicable in experimental designs.