

**NF-POGO PML Visiting Fellowship for
Ship-board Training on an Atlantic Meridional Transect (AMT) Cruise**

Fellowship Report

Name of Trainee: Yéssica Vanessa Contreras Pacheco

Name of Supervisor (Parent Institution): Dr. Juan Carlos Herguera García

Supervisor (Host Institution): Dr. Sari Giering and Dr. Marika Takeuchi

Dates of Training: 6 February to 13 May 2023

Topic of Training: Particles in the ocean – the use of in situ camera systems and state-of-the-art sampling tools for estimating ocean carbon storage via zooplankton and sinking particles

Section A

(To be completed by the fellow and returned to the POGO Secretariat)

Please note that this form will be passed on to the host and parent supervisor and when complete will be made publicly available on the [OTP](#) website;

1) Please provide a brief description of activities during the training period:

I joined to ANTICS team (Advancing Novel Imaging Technologies and data analyses in order to understand Interior Ocean Carbon Storage), and I was able to learn first-hand more about the state-of-the-art sinking particle studies and new sampling techniques like a cameras system to image zooplankton and particles throughout the water column, and a marine snow catcher to estimate particle fluxes.

During the cruise, we deployed, maintained, and began the initial data processing from the cameras system. Also, collected water samples for the marine snow catcher, were filtered for a variety of biochemical parameters, as well as sinking velocity experiments to understand the sinking behaviour of different particle types. All of these with the purpose of quantifying ocean carbon storage via the biological carbon pump.

Overall, the cruise was very successful and enjoyable as I not only learnt a lot but also met and worked with an amazing group. All members of the scientific team were always with the best attitude and willingness to teach and help. I also had the opportunity to learn about the work of other teams.

During my stay at NOC, I learnt about the cameras system calibrations, along with some basic data processing, however, the work is still in progress. In addition, I had the opportunity to speak with my host supervisor at NOC about my thesis work, and she gave me feedback and ideas that will help me

improve my work. Besides, I was able to participate in a group meeting where I was able to learn about their project management and the projects that the entire team is working on.

In addition, I had the opportunity to visit Plymouth Marine Laboratories, with Dr. Andy Rees and Dr. Sarah Breimann, where I was able to get to know the laboratories and learn about the measurements they perform, learning a little more about isotope techniques, as well as being in some meetings where I was able to learn about the different projects they are working on.

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

On May 30, I held a departmental seminar at my parent institution, where I shared the different techniques that I learnt and their advantages for the study of particles in the water column. As well as the information of my host supervisor in case they wanted to communicate personally with her or through me.

In addition, I gave two talks, one to university students in the aquatic chemistry subject at National School of Higher Studies (ENES, Mérida), and another to my middle school students, where I shared part of the activities, about how I obtained the scholarship and my personal experience with the Research group. Also, we discussed the possibilities of getting this type of scholarship and I believe this experience can encourage more than one student to look for a similar opportunity abroad or to study a scientific career.

I learned marine snow catcher and camera frame system deployment procedures during the cruise and was able to deploy each system independently by the end of the cruise. Being in charge of some implementations helped me increase my confidence in the use of new instruments at sea. In the event that I or my parent supervisor have an interest in using one of these technologies, I feel ready to use them and I am sure that my host supervisor will be glad to assist us in the transition.

Overall, acceptance to the program was a step forward in achieving my goal as a well-rounded and experienced researcher in understanding marine biogeochemistry and organic matter cycling to contribute to my region. The whole experience improved my knowledge, skills, and most importantly my confidence.

3) Please provide your comments on the Fellowship Programme.

I believe the Fellowship Program is an excellent opportunity for students and early career scientists to learn new techniques, meet new perspectives, learn different ways of doing science, network, and learn about the potential opportunities they can reach.

Thank you for this amazing opportunity.

PRINT NAME

Yéssica Vanessa Contreras Pacheco

Date: June 1st, 2023

Section B

(To be completed by host supervisor and returned to the POGO Secretariat)

Please note that this form will be passed on to the parent supervisor and trainee and when complete will be made publicly available on the [OTP](#) website;

1) Please provide your comments on the performance of the trainee.

Yéssica participated to AMT 30 cruise for 6 weeks as a member of ANTICS project, and she spent 5 weeks at National Oceanography Centre after the cruise. Throughout her fellowship, she has shown her enthusiasm to understand ANTICS project and successfully improved her skills in observations and data analysis.

Cruise – AMT 30

ANTICS team deployed marine snow catcher (MSC) and red camera frame (RCF) to collect water samples and images of particles throughout the water column. Yéssica was involved in both MSC and RCF deployments, and she learnt setup methods, deployment procedures and post-deployment data and sample management. After 3 weeks, she was able to take a lead of deployments and she was always keen to help other team members, which helped ANTICS team to work more efficiently. Yéssica has also shown her great enthusiasm in learning various instruments and sampling methods across different teams. She helped Dr. Phillippa Rickard of Heriot-Watt University to collect the sea surface microlayer using a garret screen. She also demonstrated how to collect the samples from sediment trap. Along the great contributions to field works, Yéssica led yoga sessions every afternoon which became one of the popular afternoon activities. Overall, she made a great improvement in her skills and also made a significant contribution to ANTICS works.

Office and lab work at NOC

After the cruise, Yéssica spent 5 weeks at NOC to further learn the image data processing for RCF. She screened the images collected by RCF and inserted scale bars to good quality images. The images she screened were used for AMT 30 cruise report. She also learnt image filtering to remove noise, the method to extract particle size information from images and calculate particle abundance.

Yéssica has also participated a lab experiment to calibrate RCF. We will write a technical paper about the calibration and aim to submit it in 2023 winter. Since the data processing is still required, this is an ongoing work. In order to keep updating the process, we planned to have regular meetings every 2 weeks.

2) 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.

Yéssica's PhD project is closely related to ANTICS works studying about carbon transport, and she is familiar with field works using MSC and RCF. It is possible and interesting to combine MSC and RCF with her sediment trap works.

3) Please provide your comments on the Fellowship Programme.

I believe this fellowship is a great opportunity for the students to learn various researches and build networks in the UK. For the host institute, the fellowship can be beneficial as it likely expands the collaboration opportunities.



PRINT NAME

Marika Takeuchi

Date: 13/ 06 /2023

SECTION C

(To be completed by parent supervisor and returned to the POGO Secretariat)

Please note that this form will be passed on to the host supervisor and trainee and when complete will be made publicly available on the [OTP](#) website;

1) Do you agree with the above comments and do you have any additional feedback you wish to provide?

I agree with the above comments. Besides, I think that Yéssica grew tremendously with this experience, on a personal level and in her scientific career. Her travels and getting to know more people working in her field of choice and her participation in the ship activities and analysis of the samples, and postcruise activities have greatly impacted on her growth as a marine scientist trying to understand her role with different groups of people trying to understand the same processes on carbon cycling in the water column. She has also transformed into a great role model for her fellow students at our institution and beyond which has other important implications on her personal experience resonating with the lives and growth of her peers and younger students as they realize the opening of possibilities for many of them. Although I was worry at the beginning of the time she would have to disconnect with her current work, now I realize that her trip and participation in this cruise has catalyzed other ideas and perspectives that would have probably taken a longer time for her to realize, and she is more focused on what she wants to understand from the data she is working now, now I realize her growth outpaced her work at the lab.

I would like to persue a future collaboration with the group at NOC in Southampton to enhance the work we are doing here and to establish a working relationship that will aid both ways.

On a personal level for Yessica I would like her to persue a postdoctoral stay at Southampton where she can collaborate with their efforts to understand the data they produced and for her to deepen her knowledge on how to understand the methods and processes they are characterizing.

I think this Fellowship Programme is an excellent opportunity for graduate students for their personal growth in many respects. On a personal level having to communicate and work with a different group trying to understand the same ocean processes from a different perspective and different methodologies is one fundamental outcome of this programme. To be exposed to different approaches and ways of conducting ocean research gives our students a richness that we could not provide if she would have not participated in the programme. Last but not least, the personal growth students like Yéssica experienced by participating in this programme is much larger and profound than what you would expect from a relative short duration of this fellowship programme.

PRINT NAME

Juan Carlos Herguera García

Date: 13/06/2023