

**2022 NF-POGO Visiting Fellowship for
Ship-board Training**

Fellowship Report

Name of Trainee: Zuleica Almeida Duarte

Name of Supervisor (Parent Institution): António Pinto Almeida

Supervisor (Host Institution): Carla Maria Ferreira Mesquita Palma

Dates of Training: 01/02/2022 to 30/04/2022

Training topic: Physico-chemical characterization of water bodies in the Cape Verde archipelago

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:

The NF-POGO training took place from 1 February to 30 April 2022, at the Division of Chemistry and Marine Pollution of the Hydrographic Institute, under the supervision of Dr. Carla Palma.

Before training at the Hydrographic Institute, I participated in the oceanographic expedition on the ship NRP D. Carlos I in the Cape Verde Archipelago from 30 October to 16 November, where I had the opportunity to learn how to collect and preserve samples, and how to do different laboratory analysis. The sampling was done using the rosette sampler system equipped with 12 Niskin bottles and a CTD (Conductivity Temperature and Depths) probe. The CTD measured the variation profiles of depth, temperature, conductivity, dissolved oxygen and turbidity, and the water samples were collected following a vertical profile up to 1500 m. Samples were collected to determine nutrients, metals, pH, dissolved oxygen and chlorophyll. To continue the analysis of the samples and to complete my graduation came up the idea to participate in the training at the Hydrographic Institute.

During the training at the Hydrographic Institute, I had the opportunity to learn how to determine photosynthetic pigments: before analysing the samples the filters were taken out to thaw and placed in test tubes with 90% acetone added and were placed in the Heidolph vortex to stir, were placed in the centrifuge (Megafuge Heareus - CENT01) for 15 minutes at 3000rpm and then read in the spectrophotometer (Thermo Evolution - UV-V102) which consists in reading the absorbance of the

solution containing the pigments to be analysed at wavelengths that are characteristic of the various species being studied and which are related by empirical equations.

The determination of the nutrients was done by molecular absorption spectrometry using a segmented flow autoanalyser (SKALAR Sanplus), this equipment has the capacity to analyse the nutrients in an automated way, in which the reagents and the samples are placed in the system and form coloured compounds whose colour intensity is read in a specific detector incorporated in the system. Before reading these samples, the necessary standards and reagents were prepared. The nutrients analysed were nitrite, nitrite + nitrate, reactive phosphorus, reactive silica and ammoniacal nitrogen.

The metals were determined by flame atomic absorption spectrometry and graphite chamber (Copper, Iron, Zinc, Nickel, Cadmium and Lead), hydride generator (Arsenic) and without flame (Mercury), the fundamental principle of this method is the absorption of the intensity of the electromagnetic radiation, originating from a primary radiation source, by gaseous atoms in the fundamental state.

At the Hydrographical Institute I had the opportunity to participate in another oceanographic expedition in Tagus River.

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

With the participation in the oceanographic expedition, on the ship NRP D. Carlos I, I learnt how to collect and preserve samples, to determine the chemical parameters. In the Hydrographic Institute I learnt how to determine the amount of nutrients, metals and photosynthetic pigments, I also learnt how to handle the different equipments.

I will teach the other students, the best way to collect, preserve and analyse samples for chemical parameters and also how to handle equipments.

After teaching my colleagues, we will be better prepared to participate in other oceanographic expeditions that will come up.

3) Please provide your comments on the Fellowship Programme.

For me it was a great honour to participate in this programme that has a noble goal of helping students from disadvantaged countries and at the beginning of their careers and that later they will transmit what they have learnt to other students in their countries.

Words are insufficient to thank NF-POGO and the Hydrographic Institute for the opportunity, being valuable the learning and experience that I acquired in the collection and analysis of ocean observation data.

PRINT NAME

Zuleica Almeida Duarte

Date: 30/05/2022

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.

Zuleica Duarte participated in the oceanographic campaign aboard of the NRP D. Carlos from October 30 to November 16, where she had a practical introduction to sampling techniques, treatment and analysis of samples and acquisition of in-situ data.

On board, she participated with great interest in all the activities: sample collection, preparation of the samples and analysis in-situ.

When the opportunity arose for her to come to perform the analyses of these samples in Hydrographic Institute (IH), I had no doubts in welcoming her.

The internship in IH went very well due to the characteristics of Zuleica: hardworking, interested and with critical spirit.

She performed all the analyses to which we had proposed with the samples collected in the campaign and also, she showed always availability to participate in other tasks of the laboratory. She also participated in a campaign on the Tagus River. She is a person of easy deal who quickly entered within the laboratory group of IH.

Zuleica is of congratulations for its work in the IH.

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.

Yes.

IH will have more oceanographic campaigns around Cape Verde archipelago and could be an opportunity to have more contacts with Atlantic Technical University.

The possibility to have students of marine sciences and in particular marine chemistry is very important for the students and an activity that IH have in Portugal with the students from the Portuguese Universities.

3) Please provide your comments on the Fellowship Programme.

The Fellowship Programme is an opportunity for the students and early career scientists for training oceanographic observations and training different type of analysis in other Institution.

This type of programme will make a global and regional impacts on the observation scheme for the oceans.

PRINT NAME

Carla Palma

Date: 30/05/2022

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 totally agree with the above comments. Yes, I agree that Zuleica Duarte participated in the oceanographic campaign aboard of the NRP D. Carlos from October 30 to November 16, where she learned the practical components to sampling techniques, treatment and analysis of samples and acquisition of in-situ data. She participated on board, and as reported, she participated with great interest and enthusiasm in all the activities, like sample collection, preparation of the samples and analysis in-situ. I remember when Dr. Carla Palma wrote me about this opportunity for our student, she showed total availability and willingness in received Zuleica at Hydrographic Institute to perform the analyses of these samples. During her internship at Hydrographic Institute, she reported to me frequently, saying that everything was going well, that I was enjoying it and learning a lot, and that I was being treated very well by Dr Carla Palma and all the staff.

PRINT NAME

António Pinto Almeida

Date: 02/06/2022