



REPORT ON NF AMT-POGO FELLOWSHIP PROGRAMME 2017

Trainee's Report

Name of Trainee: Mr Hashan Niroshana KOKUHENNADIGE
Dr Upul Premarathne

Supervisor (Parent Institution):

Supervisor (Host Institution): Dr Andy Rees **Dates of Training:** 02/09/17- 2/12/17

Subject of Training: Multidisciplinary training

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

During the first week of my stay at Plymouth, I attended a Health and Safety Induction Course at PML and successfully completed a Sea Survival Course and obtained ENG1 Medical certificate. In the second week, I prepared myself for the cruise, had discussions with Dr. Andy Rees, who is my host supervisor regarding the research projects and the experiments that I had to run during the cruise. In addition, I pre-weighed the chemicals, packed instruments and other equipment required for the research. In the mobilizing period of this cruise, I helped Dr. Andy Rees to set up the laboratory for our Carbon and Nitrogen fixation experiments as well as arranged the gas lines from the met platform of the ship to the Deck lab. During the cruise, I mainly involved with Carbon and Nitrogen Fixation experiment, in which I collected 20L of surface seawater (5m) samples from daily predawn CTD (38 samples in total) and filled 2.4L of seven Nalgene bottles. Out of these seven bottles, I immediately filtered 3 bottles and the suspended particles in each bottles were collected by using gentle vacuum filtration through a 25mm pre-combusted GF/F filters to determine natural abundance of ^{15}N and ^{13}C . To other 4 bottles $^{15}\text{N-N}_2$ were injected and all bottles were kept in a dark bag and agitated for 30 minutes. After the agitation, 3 Exetainer tubes and a blank sample were prepared and preserved by adding HgCl_2 . Afterwards, above Nalgene bottles were again top up to exclude air and sealed again. When performing Carbon and Nitrogen fixation experiment together, I added 4mL of ^{13}C solution to each bottles before the bottles top up and filled with seawater to exclude air. Then out of these 4 bottles, 1 bottle was incubated for 12 hours and other 3 bottles were incubated for 24 hours in a deck incubator. After the incubation period, I filtered the incubated samples and the suspended particles in each bottles were collected by using gentle vacuum filtration through a 25mm pre-combusted GF/F filters to determine ^{15}N and ^{13}C . Then I dried the filters at 50°C by using an oven and wrapped them in tin cups and formed into pellets. In the meantime, I was also taught to use Sercon INTEGRA 2, Stable Isotope Analyser to measure the $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values of the collected samples to determine the amount of Carbon and Nitrogen fixation. In addition to the above experiment, I was also involved with DNA sample gathering. I collected 10L of seawater samples from the surface (5m) and depths of Deep Chlorophyll Maximum from daily predawn and midday CTD casts (132 samples in total). Then I filtered the collected seawater samples through Sterivex-Gp, $0.22\mu\text{m}$ sterile vented filter units by using a

ColePalmer-MasterFlex L/S Multichannel Pump and samples were preserved with RNAlater Solution and stored at -81°C in a freezer.

Moreover, I helped Dr. Glenn Tarran for daily predawn WP2 bongo (200 μm) vertical haul from 200m to surface for the collection of mesozooplankton samples to study their community composition and abundance. After the deployment of the nets, we washed them with seawater first and then washed down with fresh water before stowing. Afterwards, I combined duplicate samples and passed through a 200 μm sieve and the contents retained on the sieve was then washed into a 100mL plastic bottle containing 10mL of 37% borax-buffered formaldehyde (4% final concentration) using Milli-Q water. At most stations, I collected 0.2 – 0.5mL concentrated plankton samples onto pre-ashed 25mm GF/F glass microfibre filters, placed in small petri dishes and dried them in an oven at 50°C . Once dried, samples were used to make pellets to analyse nitrogen and carbon isotopic composition. Furthermore, I helped Dr. Werenfrid Wimmer for daily weather balloon launch (a total of 38 balloons), measuring air pressure, humidity, air temperature, wind speed and direction to collect information of the lower atmosphere composition to aid the atmospheric radio transfer models of the Sentinel 3 satellite sensors. After I returned to PML, Dr. Andy Rees and Ms. Lisa Al-Moosawi educated me about how to use the Stable Isotope Ratio Mass Spectrometer (Sercon) at PML and then I analysed all ^{13}C and ^{15}N enriched samples, which we brought back with us from Falkland Islands. In the meantime, Dr. Andy Rees educated me about data analysis method and then all acquired datasets were used for data analysis.

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

As a lecturer and a researcher, I'll be using this AMT research cruise experiences in my future research and teaching at my institution. Therefore, with this inspiration, I'm planning to conduct experiments on Carbon and Nitrogen fixation for the better understanding of marine primary productivity in Sri Lankan waters and make use the knowledge and skills acquired during this on board training. Oceanography is an emerging field of academic interest in Sri Lanka and with the experiences and skills that I acquired from this training, I can lead fruitful discussions on how to develop research capacity and knowledge base at the institutional level. In addition, this research cruise experience will be extremely useful for me to plan, organize and manage future seagoing research activities at my institution.

3) Please provide your comments on the Fellowship Programme.

I had once a lifetime experience during this fellowship period. Even though I am interested in taking up research in the area of Oceanography, I have limited exposure to on board, high-tech equipment and subject expertise within my working environment. However, this on board training gave me an opportunity to experience many of advanced oceanographic research techniques that I had never been familiar with. I took this opportunity as a challenge and worked hard to get the best out of it. The overall training was very well structured in to three parts as pre-cruise preparation, conducting scientific experiments on board and post-cruise data analysis, which gave the participants an overall practical coverage in oceanographic research. Although I have took part few research cruises before, this was my longest research cruise and I am proud to be a part of this prestigious and international research endeavour. In addition to research exposure, I could practice qualities like teamwork and endurance throughout this training and this cruise gave me an opportunity to work and interact with experienced scientists who are experts in the area of oceanography and marine biogeochemistry. In the future, this network would help me to build a platform for collaborative research.

I'm proud to have a supervisor like Dr. Andy Rees as my host supervisor, who guided me from the very beginning of this training. He is one of the leading researcher in the field of Marine Biogeochemistry and I'm very lucky to work under the supervision of such a hardworking and helpful character. In addition, Dr. Glenn Tarran and Dr. Werenfrid Wimmer also guided me when I was supporting their research projects and I'm thankful for them for sharing their knowledge with me on marine plankton community studies, atmospheric sciences and remote sensing. Further, I would like to thank Ms. Lisa Al-Moosawi for supporting me in my sample analyses. Especially I'm very grateful for POGO and PML for giving me this opportunity, which further inspired me as a young marine scientist.

4) Please provide details as to how your contribution towards living expenses was spent.

A substantial amount of my living expenses was spent on foods and I spent some amount of my living allowance during my stay at Southampton and Falkland Island. The receipts have been submitted to the POGO secretariat.

Please return completed form by e-mail to: pogoadmin@pml.ac.uk