Sprouting seeds in Latin America
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LET US SHOW YOUR ART
Have any nice photos or figures to share? E-mail us your seascapes, underwater photos or photos of field work and we’ll include them in NANO News!

Sunset at Bay of Bengal. Photo by alumnus Atul Kumar
From the Editorial Board

This is my first experience as editor. It was during last year’s NANO Coordinating Meeting in Lisbon that I have been assigned editor-in-chief to the NANO newsletter. Throughout the editing process I have learned a lot and I confess that the greatest challenge was to reconcile editing with my daily activities.

The present issue of the NANO newsletter is dedicated to the past and current efforts made in Latin America with the support of NF–POGO and POGO. Reading through the following articles, I hope you get a glimpse of how these initiatives helped to improve marine sciences in this region. All these efforts are showing results. But these initiatives were only possible because of the effort of key people within Latin America and abroad. Their enthusiasm and commitment to science and outreach inspire their colleagues to keep advancing marine sciences, improving local conditions and reducing the gap in ocean observatories between the northern and the southern hemispheres. I was very fortunate to meet some of these people throughout my involvement in NF–POGO supported training programmes, and, long after my first training, I still feel inspired by them and I hope you will too.

Additionally you will also read about updates on the running NANO regional research projects. You will also meet new NANO members currently attending the NF–POGO Centre of Excellence (CoE) in Observational Oceanography training at the Alfred Wegener Institute for Polar and Marine Research (AWI), Germany; and meet Eduardo Santamaria-del-Angel, who gave us a brief interview. You will also know what the alumni that attended the NF–POGO CoE Regional Training Programme at the University of Baja California in Ensenada, Mexico, learned; and the reports on the AWI-SAHFOS summer school on time series, attended by two NANO members. You can also read on empowerment of women in Kerala, India; phenology indices and ocean colour; and on coastal reforms in the Sundarbans (Bengal region). We also invite you to join the efforts of the NANO outreach team by sharing your outreach presentations.

Finally, we would like to thank all the authors for their contributions and for sending us the nice photographs that illustrate this issue. I want to especially greet all members of the editorial board for their help, reviews and patience in making this issue possible.

Sebastian Krieger
Editor-in-chief

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An overview of POGO and NF–POGO activities in Latin America

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Since 2003, POGO, and since 2004, NF–POGO have had a long and very productive history of supporting educational initiatives, fellowships and other capacity building activities that benefit marine science research in Latin America.

The recent, combined NANO Latin American Regional Research Group/NF–POGO CofE Regional Training Programme in Ensenada, Mexico (see page 11) brought together a large number of Latin American scientists whose scientific career has benefited from previous efforts of POGO and/or NF–POGO in Latin America. This summary of POGO/NF–POGO activities in Latin America is the outgrowth of having this combined group meeting periodically over coffee, meals, or just enjoying time together. We hope that this article is complete, but may miss important events/people; we apologize for any omissions and assure everyone that they were not intentional. Finally, this article highlights a few scientists who have been engaged repeatedly with POGO/NF–POGO capacity building efforts in Latin America, some starting at the earlier initiatives (further back as 1984, or 1997) and running constantly to the current Ensenada meeting, where this article was drafted.

This article is divided in different sections that briefly describe the following training and networking programmes: Early (1984–2003) Pre-NF–POGO Programmes and initiatives and other synergistic interactions; overview of recent initiatives; POGO and NF–POGO Visiting Professorship Programmes; NF–POGO Centre of Excellence (CofE) at BIOS and AWI; NF–POGO Centre of Excellence Regional Training Programme; NF–POGO Alumni Network for Oceans (NANO); and other POGO supported training programmes. At the end, we present tables that summarize all programmes in Latin America. A table of researchers from Latin America that benefited from the above mentioned programmes is available at www.nf-pogo-alumni.org/file/view/SM_NN8.pdf.

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As antecedents to the NF–POGO initiatives we should mention the courses that Trevor Platt taught at the Catholic University and the University of Concepción in Chile during 1984 and 1985 (see article in NANO News volume 1). These early educational activities were crucial in the career of many Latin-American researchers. Some of these students went to Canada for graduate studies and then returned to their home countries including Osvaldo Ulloa, Renato Quinones, Rubén Escobedo and Vivian Lutz – who, at that time was directed by H. Bejarano and R. Negri to go to Canada due to their experiences in Trevor’s courses in Chile. This exchange of students from and towards Latin America was stimulated by Trevor and Shubha’s laboratory and continued throughout the years. As examples, Heather Bouman went for a post-doc at Osvaldo Ulloa’s laboratory in Concepción (2005), recently Heather taught at the CoFe trainings in Bermuda and received a NANO alumni from Brazil as her Ph.D. student (Priscila Lange). Later on, Trevor Plaat and Shubha Sathyendranath taught courses again in Chile in 1997 and in 2002, where Osvaldo Ulloa was the local organizer (co-sponsored amongst others by IOCCG and POGO). One of the instructors at the Olmué training course in 1997 was Vivian Lutz (Shubha’s graduate student at the time), and among the students were Roberto Millán-Núñez, Eduardo Santamaría-del-Angel (Mexico) and Adriana González Vera (at that moment a master’s student in Brazil). Due to the interaction in this course, Adriana decided to pursue her doctorate in Baja California. This research group actually just hosted the CoFe Regional Training Programme at the University of Baja California (from 19 January to 6 February 2015). Moreover, it was during the Concepción 2002 course, attended by Ana Dogliotti and Milton Kampel (students at that time), that the idea for the Antares network was fostered. This was realized during a workshop sponsored by the International Ocean-Colour Coordinating Group (IOCCG) in 2003 at INIDEP (Argentina), where the Antares network was launched. Since this early start, the Antares network grew alongside the Latin American initiatives of these international organizations. To illustrate, after the second Antares meeting (2005), an IOCCG meeting took place in Margarita Island (Venezuela); similarly, training courses in the region provided a venue for an Antares meeting (e.g., Brazil 2006 and 2009). This history of reinforcing the interaction and enhancing capacities through the years led Antares to receive an important grant from the Inter-American Institute for Global Change Research (IAI) in 2013, which is propelling the network into a new connection between natural and social sciences. This subject has become a major goal internationally, bringing the ocean into the agendas of “global climate change”, “ecosystem services” and “societal benefits”, using similar approaches as those from “Oceans and Society: Blue Planet” (http://www.oceansandsociety.org/) – the over-arching marine task within the Group on Earth Observations (GEO).

Overview of recent (2003–present) NF–POGO initiatives

Since 2003, POGO, and since 2004, NF–POGO have had a long and very productive history of supporting educational programmes, fellowships and other capacity building initiatives that benefit marine science research in Latin America and the Caribbean. These initiatives were complemented by IOCCG activities in several instances. To date, trainees and/or instructors from 12 countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Mexico, Peru, Trinidad and Tobago, Uruguay and Venezuela) have been engaged. Lecturers and/or mentors from a number of developed countries (e.g., Canada, Japan, Korea, UK, USA) have also taken part in delivering capacity building opportunities to trainees from Latin America, acting either as instructors to workshops/training programmes offered in Latin America and/or hosting fellows in their home institutes. In addition, a large number of trainees from outside Latin America (Belgium, Egypt, Germany, India, Italy, Spain, Sweden and USA) have studied in Latin America, with support from POGO and/or NF–POGO, further extending the Latin American scientific network.
An overview of POGO and NF–POGO activities in Latin America

Visiting Professorship Programmes of POGO and NF–POGO

The goal of the visiting professorship is to offer capacity building in the host institution, leading to enhanced sustained ocean observations that address societal issues of the day. The priority is to develop highly-trained scientific professionals. Additional important goals include promoting contacts, collaborations and networking among institutions of developing and developed countries. This enhanced interaction goes many times across regions. Invited instructors from Latin America have collaborated in programmes in other regions. As an example, Vivian Lutz was invited to teach in India during the Visiting Professorship Programme conducted by Trevor Platt in 2004–2005. In the same way students from outside Latin America have pursued further studies in the region. For example, Satya Prakash, who attended the POGO visiting professorship in Cochin (2004–2005) went to Concepción for his post-doctoral fellowship. He is still active in the NANO regional research program for the Indian subcontinent.

The Visiting Professorship Programme started in 2003 sponsored by POGO and in January 2004 became NF–POGO, as a partnership between POGO and the Nippon Foundation (NF) for three years (from 2004 to 2007). This initiative metamorphosed into the Centre of Excellence (CoE) Programme in 2008. In Latin-America the first visiting professorship was offered in Brazil in 2003, followed by another one in Brazil in 2006, in Argentina in 2010, and more recently one again in Brazil last year:

Brazil 2006

Course title: Evaluation of satellite ocean–colour algorithms and products in coastal regions of Central and South America
Dates: 17 April to 12 May, 7 to 25 August, 2006
Visiting professor: Robert Frouin, Scripps Institution of Oceanography, UCSD, USA
Hosts: Dr Milton Kampel, Instituto Nacional de Pesquisas Espaciais (INPE) and Instituto Oceanográfico da Universidade de São Paulo
Components: fieldwork, laboratory and seminars on remote sensing and modelling
Number of participants: 16
Countries of origin: Argentina, Brazil, Colombia, Mexico, Peru and Venezuela

• To promote long-term cooperation between Central and South American countries and to improve the North-South American dialogue within the American continent.

Other components of the Visiting Professorship involved travel by Dr. Robert Frouin to Mar Del Plata, Argentina, to provide training and to lend a SIMBADA radiometer to INIDEP for routine measurements at their Antares time series station, and to train INIDEP students and scientists in the use of the instrumentation. After the training course at INPE, Dr. Frouin travelled to São José dos Campos and Ubatuba to test newly acquired optical instrumentation, to refine measurement protocols, and to participate in the October 2006 Antares cruise in Ubatuba. Among the students were René Ayala (who later on participated in year 1, CoE–BIOS), Mayza Pompeu (in charge of the field work at Antares–Ubatuba time series station, who participated in later courses), Ana Dogliotti, Eduardo Santamaría and Adriana González Silvera (the three of them took part in other courses as students and instructors).

This first NF–POGO Visiting Professorship effort in Latin America was led by Dr. Robert Frouin (Scripps Institution of Oceanography – SIO, USA) in 2006. There were multiple parts of this Visiting Professorship, starting with a training course at the Brazilian National Institute for Space Research (Instituto Nacional de Pesquisas Espaciais, INPE). Dr. Robert Frouin, with the help of experts from the international ocean–colour community, including Dr. Greg Mitchell (SIO, USA), Dr. Vivian Lutz (INIDEP, Argentina), Prof. Ichio Asanuma (Tokyo University, Japan) and Dr. Ewa Kwiatkowska (NASA, USA), provided training on the use of remotely sensed ocean–colour data as a tool for analysing the marine ecosystem. Other objectives included:

• To build capacity in Central and South America to exploit satellite ocean–colour and other, complementary data sets in the quantitative study and monitoring of coastal waters and ecosystems;
• To augment the measurement suite at the ANTARES and other stations with radiometric data, by making available SIMBADA radiometers on a quasi-permanent basis;
• To develop strategies for long-term successful observations and research in biological oceanography of the coastal ecosystems in the region;

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The theoretical component (more than 35 hours) was held in Buenos Aires at the Museo Argentino de Ciencias Naturales and the practical/discussion seminars component (more than 21 hours) was held 500 km south of Buenos Aires, at Estación Hidrobiológica de Quequén, on the rocky coast. The POGO course provided an integrated combination of formal lectures, research seminars, discussion workshops and fieldwork to inform research and to provide training in the area of climate change responses of coastal and near-shore ecosystems. This was intended to inform and enable the establishment of broad-scale observations and time series, which are essential for separating climate change from local and regional scale impacts. Research underpinning adaptive responses to climate change was also outlined regarding its impacts and the design of sea defences. The following NF–POGO priorities were explored in the context of climate change and the relationship between biodiversity and ecosystem functioning: fixed point time-series observations, large-scale observations of biodiversity, emerging approaches for ocean observations, data management, coastal observations, coastal zone management and modelling future states in the coastal zone.

| Course title: Understanding climate driven change in biodiversity and ecosystems: observations, modelling and experiments | Dates: 12 February to 9 March 2010 | Visiting Professor: Stephen J. Hawkins, Bangor University, School of Ocean Sciences, UK | Hosts: Maria Gabriela Palomo, Senior Researcher, National Commission for Research in Science and Technology (CONICET) Argentina; Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentina | Participation in fieldwork and seminar component: Juan Jose Cruz Motta, Universidad Simon Bolivar, Venezuela | Number of participants: 22 | Countries of origin: Argentina, Brazil, Uruguay and Venezuela |

Argentina 2010

Brazil 2014

Course title: Innovative integrated marine monitoring systems in coastal regions
Dates: 19 October to 3 November 2014
Visiting Professor: Renzo Mosetti, OGS, Italy
Hosts: Dr Eduardo Marone, Center for Marine Studies, Federal University of Paraná, Brazil
Number of participants: 49
Countries of origin: Argentina, Brazil, Colombia, Peru and Uruguay

The POGO course was organized into lectures and practical activities, mainly processing observational data, including a field trip to the Paranaguá Bay for doing observation of currents with electromagnetic and acoustic devices, measuring water properties with CTD, etc. The group was divided in two, with all the participants taking the morning lectures together and, in the evenings, Prof. Mosetti continued with the group of graduates and covered topics more deeply, while Prof. Marone took care of the undergraduates. At the end, the participants received around 30% more training time than originally planned.

Table 1 - Overview of POGO and NF–POGO capacity building workshops held in Latin America. The country names in bold font indicate the country in which the workshops were held.
An overview of POGO and NF–POGO activities in Latin America

NF–POGO CofE–BIOS and CoF–AWI

The Nippon Foundation–POGO Centre of Excellence (NF–POGO CoFE) provides world class education and training courses in the field of observational oceanography. The Bermuda Institute of Ocean Sciences (BIOS) hosted phase I of the NF–POGO CoFE annually during four consecutive years (from 2008 to 2012). Starting from 2013, phase II of the NF–POGO CoFE has been hosted by the Alfred Wegener Institute for Polar and Marine Research (AWI). In both locations, the CoFE has offered 10 students a 10 month multidisciplinary programme that involves a series of lectures, laboratory studies, ship board training, and an opportunity to conduct independent research. Core skills such as scientific writing, statistics and public speaking are also emphasized.

As of the writing of this article, from all 60 NF–POGO CoFE scholars, fourteen (14) are from Latin America: nine in CoFE–BIOS and five in CoFE–AWI. Some of the NF–POGO CoFE participated in other capacity building programmes supported by POGO or NF–POGO. René Ayala Campos (Venezuela) and Fabricio Guaman (Ecuador) had also attended one of the previous NF–POGO regional trainings. Whereas Lilian Krug (Brazil) attended the Austral Summer Institute (ASI) with support from POGO and has been awarded a POGO–SCOR fellowship to visit Plymouth Marine Laboratory (PML) in the UK; Priscila Lange (Brazil) and Rafael Jose Rasse Boada (Venezuela) were also POGO–AMT fellows; and Shaaizia Salina Mohammed (Trinidad and Tobago) and Sebastian Krieger (Brazil) also attended the most recent CoFE Regional Training Programme in Ensenada, Mexico.

NF–POGO CoFE Regional Training Programme

The NF–POGO Visiting Professor Programme morphed into the NF–POGO CoFE Regional Training Programme (RTP) in 2008. The first RTP in Latin America was organized and hosted in Brazil by Milton Kampel in 2009; the second programme in Latin America was held in 2015 in Ensenada, Mexico.

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The most recent RTP was held in Ensenada, Baja California, Mexico earlier this year (see page 11). Lectures and laboratory experiments were held by Ana Doglio (CONICET, Argentina); Crystal Thomas (NASA, USA); Greg Mitchell, Mati Kahru and Robert Frouin (Scripps Institution of Oceanography, University of California, USA); Natália Rudorff (Instituto Nacional de Pesquisas Espaciais – INPE, Brazil); Vivian Lutz (IIMyC – INIDEP, Argentina); Adriana González Silvera, Eduardo Santamaria-del-Ángel, Roberto Millán Núñez (Facultad de Ciencias Marinas, Universidad Autónoma de Baja California, Mexico). Gerald Plumley (NF–POGO Centre of Excellence in Observational Oceanography, AWI, Germany) also accompanied the workshop’s activities.

The overall goal of the RTP was to provide the theoretical background and the skill-set required to implement and apply measurements of bio-optical variables in seawater to both remote sensing and to the study of biogeochemical variability of coastal waters. Lectures were on topics such as: phytoplankton composition and pigments, inherent optical properties (IOPs) in seawater, and remote sensing of ocean colour and IOPs. Water samples collected during the field work were analyzed to determine phytoplankton community composition using four different and complimentary methodologies: microscopy; absorption spectroscopy; high performance liquid chromatography (HPLC); and satellite ocean colour remote sensing.

Having Ana Dogliotti and Natália Rudorff (two former NF–POGO trainees) as instructors shows the continued progression and benefit of POGO/NF–POGO training in meeting the long-term goal of creating a global network of ocean scientists. Furthermore, Vivian Lutz (IIMyC–INIDEP, Argentina), Robert Frouin (SIO, USA) and Greg Mitchell (SIO, USA) continue to play a major role in the NF–POGO training programmes in Latin America and inspire the future generations of marine scientists.
An overview of POGO and NF–POGO activities in Latin America

Other POGO Training Programme Activities Involving Latin America

POGO hosts other capacity building programmes from which Latin American trainees have benefited: POGO–AMT fellowship, POGO–SCOR fellowship, and Austral Summer Institute in Conception, Chile. In total, 173 students from Latin America have benefited from these initiatives.

POGO–AMT Fellowship

The Atlantic Meridional Transect (AMT) is a long-term multidisciplinary ocean observation programme involving biological, chemical and physical oceanographic studies in yearly research cruises between the UK and destinations in the South Atlantic Ocean. The POGO–AMT fellowship provides hands-on, sea-going experience to young scientists from developing countries and economies in transition. The fellowship is open to scientists, technicians, graduate students (Ph.D. and M.Sc.) and post-doctoral fellows involved in oceanographic research activities. The selected fellows participate in cruise preparation and planning; go on the cruise; and analyse the samples and interpret the results after the cruise. From the seven POGO–AMT fellows, three were from South America: Mario Vera (Uruguay, 2008), Priscila Lange (Brazil, 2012) and Rafael Jose Rasse Boada (Venezuela, 2014). Rafael and Priscila were also scholars of the NF–POGO CoF–BIOS fellowship in years 3 (2010/2011) and 4 (2011/2012), respectively.

POGO–SCOR Fellowship

POGO and the Scientific Committee on Oceanic Research (SCOR) jointly fund this programme which is designed to promote training and capacity building. Its main purpose is to advance sustained ocean observations and their applications globally. It offers scientists, technicians, graduate students (Ph.D.) and post-doctoral fellows from oceanographic centres in developing countries and countries with economies in transition the opportunity to visit other oceanographic centres for a short period. Training can be on any aspect of oceanographic observations, analyses, and interpretation. This programme has awarded over 150 fellowships since 2001, from which 51 were to scholars from Latin American institutions (see table 2). Five fellowships went to NANO members; and Sergio Cerdeira Estrada and Vladimir-Giovanni Toro Valencia, both from Mexico, were awarded twice. Natália de Moraes Rudorff – trainee during the CoF RTP 2009 in Arraial do Cabo and lecturer during the CoF RTP 2015 in Ensenada – was a Ph.D. student at Instituto Nacional de Pesquisas Espaciais (INPE), Brazil and visited the Scripps Institution of Oceanography, USA, to study the variability in ocean-colour properties. Sergio Cerdeira Estrada – trainee during VPP 2006 in São Paulo – from the National Commission for the Knowledge and Use of Biodiversity in Mexico City, Mexico, visited EOMAP (Earth Observation and Mapping) in Germany to derive standardised products using hyperspectral satellite images; and the University of South Florida to study red tide events using satellite sensors. Lilian Krug – a NF–POGO CoF–BIOS year 2 scholar – benefited from this fellowship during her Ph.D. at the University of Algarve, Portugal and was able to visit Plymouth Marine Laboratory (PML), UK, to study biogeochemical provinces.

POGO–AMT fellow: Rafael Rasse preparing a bio-argo instrument for the AMT cruise

NF–POGO CoF–BIOS fellow: Lilian Krug

Austral Summer Institute

The Austral Summer Institute (ASI) is run annually at the University of Concepción in Chile; it is co-sponsored by POGO. The Institute takes approximately 30 students for a series of lectures on specific topics relating to the general theme of the Institute. Between 2007 and 2015, POGO supported 119 students from nine Latin American countries as well as seven countries outside Latin America (see table 2).

Austral Summer Institute vessel at Dichato, Chile

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The Nippon Foundation and the Partnership for Observation of the Global Oceans have created a network of former scholars called the NF–POGO Alumni Network for Oceans (NANO). The goals of NANO are to maximize the benefits of the alumni from the training they have received, to facilitate network interactions between alumni, and to promote joint (regional coalition) research efforts. NANO has two classes of members: alumni and friends. Alumni include scholars from the Centre of Excellence (CoFe) at BIOS and the CoFe at AWI, the CoFe Regional Training Programmes in Brazil, Vietnam, India, Philippines, and Mexico, and the Visiting Professorship Training Programmes in India, Sri Lanka, Fiji, Brazil, Tunisia, and Vietnam. NANO is currently organized into regional coalitions. One of these research groups is the Latin American Regional Coalition, which is briefly described below.

Currently, 72 individual trainees attended one or more NF–POGO supported training programmes. From these trainees, 58 are NANO members. For more details, please refer to table 2 and [www.nf-pogo-alumni.org/file/view/SM_NN8.pdf](http://www.nf-pogo-alumni.org/file/view/SM_NN8.pdf). Detailed research profiles of NANO members in Latin America are available on the web page [http://www.nf-pogo-alumni.org/Latin+America](http://www.nf-pogo-alumni.org/Latin+America).

Latin American NANO
The Latin American Regional Project for the NANO Network (LA–NANO) started in April 2012. It was coordinated by Ana Dogliotti and was supported by Guillermina Ruiz (a recent trainee in the CoFe RTP 2015–Ensenada) with general supervision of Vivian Lutz. One of the achievements of the first phase of the project was to send more than 50 pigment samples from 6 time series stations of the Antares network (Argentina, Brazil, Colombia, Mexico, Peru and Venezuela) to the Ocean Ecology Laboratory, at the NASA Goddard Space Flight Center (Greenbelt, Maryland, USA), for high performance liquid chromatography (HPLC) pigment analysis.

The second phase of the LA–NANO project was coordinated by Jaimie Rojas (Venezuela, a trainee at the CoFe RTP 2009–Arraiaí do Cabo) and supported by advice from Vivian Lutz. A workshop on “Ecological use of marine phytoplankton pigments at the Antares-ChloroGIN time-series-stations” was carried out in October 2013 at the Station of Marine Research of the La Salle Foundation for Natural Sciences in Margarita Island, Venezuela. Briefly, the workshop consisted of lectures, working sessions and group discussions on the topics regarding phytoplankton pigment analyses used in oceanographic research and the possibilities of carrying out HPLC analyses in Latin America. A total of 17 participants were gathered including two special guests, Suzanne Roy (Université du Québec à Rimouski, Canada) and Crystal Thomas (NASA Goddard Space Flight Center, USA), eight representatives of the five guest Latin-American countries, and 7 local researchers from Venezuela. Preliminary results on the “Variability in phytoplankton pigments at the Antares/ChloroGIN time series stations” and ancillary information from the participating sites was reported.

The third phase of the LA–NANO project is ongoing under the coordination of Adriana González Silvera (UABC, Mexico) and with the assistance of Natalia Silva Hernández (UABC, Mexico). It included the continuation of pigment sample collection at the six participating sites and the gathering of the samples at the workshop held in conjunction with the recent CoFe RTP 2015 at UABC (Ensenada, Mexico). The main subject of discussion of the LA–NANO workshop was the production of a publication with the results obtained from pigment analysis at the six time-series-stations. For more information on this topic please read the accompanying article in this issue of the newsletter on updates of the LA–NANO project (page 22). Details on this project, as well as the mentioned reports are available on the web page [http://www.nf-pogo-alumni.org/Latin+American+Regional+Project](http://www.nf-pogo-alumni.org/Latin+American+Regional+Project).
An overview of POGO and NF–POGO activities in Latin America

Concluding Remarks

POGO and NF–POGO initiatives, in a constructive synergy with other organizations (e.g., IOCCG), have a long and very productive history of supporting capacity building workshops (table 1), training programmes as well as fellowships from which over 300 Latin American marine scientists have benefited. In this article, we summarized the training programmes and tried to be as accurate as possible. Trainees from 12 different countries in Latin America and the Caribbean participated in one or more programmes (table 2). Most trainees were from Brazil, Argentina, Chile and Mexico. At http://www.nf-pogo-alumni.org/file/view/SM_NN8.pdf we show a list of all trainees and instructors from research institutions from and/or training programmes held in Latin America. From these, 29 trainees and 5 instructors participated in more than one of the training programmes. Even long after their training, many of the participants still feel inspired and motivated by their experience in the different programmes and by the passion that instructors, senior scientists and other trainees have for marine science. We highlighted a number of trainees and are confident that many more of them already contribute to the advances in marine science; to the establishment of a solid research network within Latin America and beyond; to help determine marine, environmental and public policy; and acting as multipliers for the future generations. Although in some ways it seems just the beginning, since nowadays challenges call for even stronger collaboration within scientists, it is valuable to see the interactions already achieved through networking in Latin America. Finally, these advances are a direct result from the support of POGO and the Nippon Foundation, as well as the hard work and commitment of all instructors and trainees.

Acknowledgements We would like to thank Trevor Platt and Shubha Sathyendranath for their invaluable input and suggestions, ensuring we highlight key people and that we summarise the most important historical facts; Sophie Seeyave for sending us the most current information on the different training programmes.

Call for Personal Outreach Projects

“Education is the most powerful weapon which you can use to change the world.” Nelson Mandela

We announce a call for small projects for outreach and education performed by alumni in their countries. Outreach is an activity of providing services to populations who might not otherwise have access to those services. Thus we expect proposals which main aim is to distribute knowledge and/or awareness to ocean-related issues. The maximum amount by which it can be applied is US$500, which can only include costs of educational materials, tools, transortation or expenses related to material preparation (e.g. printing).

Please send the completed form of the proposal to monikao@ioplan.gda.pl by the 30th of May 2015.

Visit http://www.nf-pogo-alumni.org/NANO+Outreach for more information and reports of past projects.
NF-POGO CofE-AWI Regional Training Programme in Mexico

Phytoplankton Bio-Optical Variability
Application to the Study of Coastal Systems
Dr Adriana G. Silvera1, Natalia S. Hernández1 and Dr Sebastian Krieger2

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2Centro de Biologia Marinha, Universidade de São Paulo, Brazil

A NF-POGO CofE Regional Training Programme (RTP) was held jointly with a NANO Regional Workshop at the University of Baja California (Ensenada, Mexico) from 19 January to 6 February 2015. The title of the Ensenada training was “Phytoplankton Bio-optical Variability: Application to the Study of Coastal Systems”. The overall goal of the RTP was to provide NANO alumni and RTP trainees with the technical background and skill-set required to apply measurements of bio-optical variables in seawater to remote sensing and to studies of biogeochemical variability in coastal waters. These goals were met through two specific methods: 1) lectures, including theoretical aspects and fundamental science; 2) laboratory and field work that emphasized practical applications (e.g., field cruise, pigment analysis; light absorption properties of particles and dissolved material).

Course outline

- Phytoplankton pigments in oceanography
  - Phytoplankton composition and pigments
  - Sources of variability in phytoplankton pigments
  - Pigments measurements: from spectrophotometer to HPLC
  - HPLC methods for pigment measurements
  - Pigments as indicators of taxonomy and size classes (theory and models)
  - Microscopy as a validation tool for HPLC taxonomy

- The inherent optical properties (IOPs)
  - Water inherent optical properties
  - Radiative transfer and IOPs
  - Dependence on phytoplankton physiology (size, composition, photo acclimation)
  - IOPs measurements: from laboratory to remote sensing

- The remote sensing of ocean colour and IOPs
  - Principles of ocean colour remote sensing
  - Estimation of chlorophyll-a concentration and IOPs
  - Estimation of phytoplankton functional types (PFTs)

There were three lecturers from Mexico, four from the USA, two from Argentina, and one from Brazil (table 1). Furthermore, a Canadian scientist made a guest lecture and Gerald Plumley – the CofE-AWI coordinator currently in Germany – also took part. All are experts in their respective fields. Two of the lecturers, Ana Dogliotti (Argentina) and Natália Rudorff (Brazil), were trainees in previous NF-POGO supported capacity building programmes held in Latin America. Both Ana and Natália recently obtained their Ph.D. degrees and have been very active in marine science research. As a result, they both were invited to give lectures for the training programme. Such professional growth of NANO alumni provides evidence for the long-term successes of the capacity building efforts of NF-POGO initiatives in Latin America. In addition, several staff members from Mexico and other countries (e.g. USA) played an important role in delivering the necessary training.

The Regional Training Programme/NANO workshop in Ensenada was very successful. A total of 28 trainees from 12 countries participated in the three week training. Most trainees were from Mexico (14). In addition, there were also trainees from Argentina (1), Brazil (3), Chile (1), Colombia (1), Ecuador (2), India (1), Peru (1), Spain (1), Trinidad and Tobago (1), Uruguay (1) and Venezuela (1). The training was attended by scientists at various career stages: senior researchers, post-doctoral research fellows, lab technicians, Ph.D. and M.Sc. graduate students as well as under graduate students were among the participants. Visit
NANO website: www.nf-pogo-alumni.org

Lectures were divided into three different sections: 1) phytoplankton pigments in oceanography; 2) inherent optical properties; and 3) remote sensing of ocean colour. The extended outline of the lectures is presented below. During the workshop, trainees introduced themselves giving short presentations about their own research. This provided a glimpse into each other’s research interests and skills, and stimulated fruitful scientific discussions during the breaks. Despite their different backgrounds, all participants showed a strong understanding and interest in marine science. Early career researchers were particularly enthusiastic.

Hands-on activities were one of the highlights of the workshop. Participants were divided into three groups – ensuring a balance between undergraduate and graduate students, and experienced researchers. Every group also included people from different countries. Participants from each group collected seawater samples at different locations in Todos Santos Bay and analysed them on their return to the laboratory. The main aim of this short study was to determine phytoplankton community composition using four different and complementary methodologies concurrently: 1) microscopy; 2) absorption spectroscopy; 3) high performance liquid chromatography (HPLC); and 4) satellite ocean colour remote sensing. Each trainee contributed with his/her own expertise to the sample analysis and writing up of the reports. At the end of this short study, each group presented a summary of their results in a 30-minute talk in English. From these presentations, it has become apparent that all trainees benefited and learnt a lot from the workshop.

The workshop also provided a unique networking opportunity. Many participants made new friends and learned about different cultures. We hope that these friendships will last for a lifetime. For some participants it was the first time to leave their home country, or even a city. This unique experience made them realize that it is also possible to feel like being at home amongst their new family. It was a chance to practice a foreign language, even “Spanglish” or “Portuñol”. Another special experience was the taste of Mexican cuisine. Some participants tried spicy food for the first time and they were surprised to realize that to non-Mexicans “no pica” in reality may mean hot. Moreover, most participants went on a wine tour near Ensenada. Another tour was to lake Hanson, which was completely dry due to the strong drought that affects Baja California, raising concerns.

“I hope to utilize this experience to assist my institute in creating a time series to investigate the seasonal variations of the Orinoco outflow in the waters around Trinidad and Tobago”.
Shaazia Mohammed, Trinidad and Tobago

“I will apply all that I have learnt on match up analysis to validate satellite algorithms at EPEA time series station”.
Maria Ruiz, Argentina

“The immediate application of all I have learnt from this course will be used in my doctoral thesis, especially the retrieval and use of satellite imagery”.
Mauricio Anderson, Mexico

“It seems like yesterday when I got the acceptance letter. Till date, I am in a impression that I am at Baja California due to random memorization of unforgettable moments. With this acquired knowledge, I hope to serve my organization in a better way. Thanks to NF-POGO for extending this opportunity for me and I am proud to be member of NANO”.
Sanjiba Baliarsingh, India

“The concepts and methodologies learned during the three weeks will be applied to the study of bio-optical properties of the Gulf of California, as part of my Ph.D. thesis”.
Stella Turizo, Colombia
about climate change. The trainees also listened to a live session of mariachis singing *La Cucaracha* and, afterwards, tried to hit a *piñata* filled with treats using a wooden stick, blindfolded and after being spun a number of times.

To conclude, it is clear that a cohort of early career scientists and experienced researchers greatly benefited from the training. We expect and believe that most of them will apply the acquired scientific knowledge and technical skills as they progress throughout their scientific careers. It is important to note that the workshop also served to strengthen the marine science research network within Latin America, and to make connections with other countries. We are confident that profitable outcomes and scientific integration will arise from this workshop in the whole Latin American region.

### Table 1 - Instructors of the 2015 CofE Regional training programme

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adriana G. Silvera</td>
<td>Facultad de Ciencias Marinas, Universidad Autónoma de Baja California</td>
<td>Mexico</td>
</tr>
<tr>
<td>Ana Dogliotti</td>
<td>National Commission for Research in Science and Technology</td>
<td>Argentina</td>
</tr>
<tr>
<td>Crystal Thomas</td>
<td>NASA Goddard Space Flight Center</td>
<td>USA</td>
</tr>
<tr>
<td>Eduardo S. del Angel</td>
<td>Facultad de Ciencias Marinas, Universidad Autónoma de Baja California</td>
<td>Mexico</td>
</tr>
<tr>
<td>Greg Mitchell</td>
<td>Scripps Institution of Oceanography, University of California</td>
<td>USA</td>
</tr>
<tr>
<td>Mati Kahrus</td>
<td>Scripps Institution of Oceanography, University of California</td>
<td>USA</td>
</tr>
<tr>
<td>Natália Rudorff</td>
<td>Instituto Nacional de Pesquisas Espaciais</td>
<td>Brazil</td>
</tr>
<tr>
<td>Robert Foulin</td>
<td>Scripps Institution of Oceanography, University of California</td>
<td>USA</td>
</tr>
<tr>
<td>Roberto M. Núñez</td>
<td>Facultad de Ciencias Marinas, Universidad Autónoma de Baja California</td>
<td>Mexico</td>
</tr>
<tr>
<td>Vivian Lutz</td>
<td>IIMyC – INIDEP</td>
<td>Argentina</td>
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Meet the new Pogonians

Pogonians year 6 (2014 - 2015)

Mariele Paiva

*Check the alumni wikipages at http://www.nf-pogo-alumni.org/CofE+Alumni#x2014-2015

Ana Carolina Peralta (Venezuela) Carol was born in Caracas (Venezuela) and she loves everything related to nature since she was a child. Always curious about the human being and its link to the natural environment, she decided to study biology in Argentina, where she pursued her bachelor in biology (zoology). After that, Carol started an internship in marine biology, working with ecology and reproduction of marine molluscs. A few years later, she went back to Venezuela and completed her Ph.D. in natural science at the University Simón Bolívar. She has worked on the impacts of water temperature (e.g. life cycles history, intracapsular embryo development) on the reproductive biology and ecology of marine gastropods from natural populations in an upwelling region and in experimental conditions. Her scientific interests are related to the impacts of environmental factors on physiological processes and population dynamics of marine gastropods or bivalves. She believes that the NF-POGO CofE training will complement her skills in marine biology with the oceanographic component. In the short term, she would like to be a professor in a university and have a research team in her country. Carol's passion is working in the marine environment, especially in her local region because she loves “to hear the sound of the waves and to see the fisherman's small boats searching for a good catch”.

Arnaud Nicolas (Mauritius) Arnaud holds a B.Sc. (with honours) in marine science and technology from the University of Mauritius and an M.Sc. in applied marine science (oceanography) from the University of Cape Town. His master’s thesis title is: “Historical climate variability reconstructed from massive coral records in the western Indian Ocean (WIO)”. Arnaud worked with paleotemperature records (δ18O and Sr/Ca) to establish heterogeneous distribution of warming rates across tropical and subtropical WIO regions and to assess coral thermal stress. He has been working as an associate research scientist at the Mauritius Oceanography Institute since 2011 on the projects: Coral Farming and Reef Rehabilitation, and Molecular characterization of Marine Organisms in the Republic of Mauritius. His main research interests include coral reef ecology, climate change, climate dynamics and variability and paleoclimatology. Arnaud believes that the NF-POGO CofE-AWI programme will equip him with the skills and knowledge to work towards the advancement and development of oceanography in Mauritius, the Indian Ocean region and internationally.

Assefa Derbew (Ethiopia) Assefa has a B.Sc. in meteorology and M.Sc. in oceanography from Arba Minch University, Ethiopia and Norwegian University of Science and Technology, respectively. Assefa works as a lecturer and researcher at the department of meteorology and hydrology in Arba Minch University, where he received his first degree. His research interests include global and regional climate change, and numerical modelling. To Assefa, the NF-POGO CofE-AWI program is a good opportunity to increase his scientific knowledge in oceanography as a multidisciplinary science and to obtain new skills to understand the ocean-atmosphere interactions and its impact on climate change. After the completion of this program, Assefa will return to Ethiopia to train other researchers who are currently working in the areas of climate change. He plans to conduct a series of workshops and educational meetings throughout the country in order to achieve a positive change of thinking and acting towards climate change.

Atul Kumar Yadav (India) Atul was born in the small village of north India called Jaunpur. His home now is in Lucknow, which is one of the major cities in north India. However, Atul likes to spend his time in Jaunpur because it makes him feel close to nature. After finishing school, he completed his bachelors in information technology at Gautam Buddha Technical University, India. During the bachelor’s degree, Atul worked with radio frequency identification (RFID) tags. After that, he became interested in oceanography and climate science and in 2014 he finished his masters in climate science and technology at the Indian Institute of Technology. Atul studied the variability of the Antilles current, in the North Atlantic, forced by in-situ and NCEP-NCAR reanalysis winds. Now Atul is one of the NF-POGO CofE scholars and he is learning “new ways to observe the oceans” – from biological, chemical, physical perspectives, as well as from space. He would like to develop a research project using paleo-climate proxies (i.e. ice and sediment cores) to understand the climate dynamics with the help of numerical models. This is a new field for him and he is curious to learn new things. He believes that this NF-POGO CofE experience will be a milestone in his career. For the long-term, Atul wants to join a research institute in his country and wants to work with collaborative projects globally. Apart from this, he likes to do community work and sports. He also intends to help unprivileged children by providing them basic education so that they can get better opportunities.

Lamona Bernawis (Indonesia) Lamona has a B.Sc. in marine science and technology from the Institut Pertanian Bogor, Indonesia. During her bachelor’s degree Lamona investigated the temperature and pressure responses at Lombok strait, Indonesia to the 1997 and 1998 El Niño/La Niña. After that, she completed her M.Sc. and Ph.D. in ocean science at the
Tokyo University of Marine Science and Technology (Department of Physics and Environmental Modelling). Her thesis topics were related to the double diffusive convection in the Western Pacific Ocean and the ocean-atmosphere interaction. Lamona has gained a strong experience in research and teaching in her home country, working at Institut Teknologi Bandung in the oceanography programme, then at the laboratory of Earth Physics and Complex System. She was motivated to join NF-POGO CofE-AWI to enhance her knowledge in oceanography by interdisciplinary research and to refresh some elementary yet fundamentals of oceanography.

Mariele Lopes de Paiva (Brazil) Mariele is a chemical oceanographer, from São José do Rio Preto, Brazil. She has a bachelor’s degree in oceanography from the Federal University of Rio Grande (2011) and she earned her M.Sc. in chemical oceanography last year at the same institution. In her master’s thesis, she investigated the influence of subterranean groundwater discharge in the distribution of nutrients along the South-Brazilian coast, using both stable and radioactive isotopes as geochemical tracers. Her research interests include: the impact of groundwater-seawater interaction on biogeochemical cycles in the ocean; and the use of radionuclides as tracers of marine processes. She is grateful to be trained by some of the international experts in marine science at NF-POGO CofE-AWI. She believes that this program will improve her professional skills, which will be important for her further studies in oceanography and long-term career.

Nguyen Thi Thai Hoa (Vietnam) Hoa attained her B.Sc. and M.Sc. in environmental science. She has experience in modelling oil spill trajectory in the sea. Her main experiences are modelling organic pollutant dispersion in rivers using both Mike 21 software and remote sensing techniques and then visualize simulation results by generating maps using GIS. She would like to improve her skills in open source software (e.g. R, Delft3D, GRASS GIS, QGIS) and programming languages (e.g. Python). Taking part in NF-POGO CofE at AWI this year, she would like to conduct research on the natural and human influences on coastal ecosystem by means of observations, analyses, numerical modelling, remote sensing and GIS.

Khishma Modoosoodun (Mauritius) Bonjour, tou korek? This is the Mauritian greeting: “Good morning, is everything fine?” Khishma has her bachelor’s degree in marine science and technology from the University of Mauritius. Her undergraduate thesis focuses on phytoplankton and zooplankton abundance and diversity at Balaclava Marine Protected Area in the North-West coast of Mauritius. She has more than three years of working experience in the field of marine science. After her graduation, she worked for one year as environmental officer at Reef Conservation – a non-governmental organization – where she was also involved in educational outreach activities. She then joined the Mauritius Oceanography Institute as associate research scientist and was involved in the Pearl Oyster Culture project, satellite oceanography and physical oceanography projects. She has a deep passion in marine science. Khishma is an advanced PADI-certified diver. In 2013 she had the opportunity to participate in the Deep-Sea Hydrothermal Vent Scientific Research Cruise in the central Indian Ocean on the Japanese research vessel Yokosuka. Khishma’s main research interests are primary productivity and remote sensing and in which she wishes to pursue her Ph.D. studies.

Folly Serge Tomety (Togo) Serge was born in Lomé, capital of Togo. Serge pursued his bachelor and master degree in physics at the University of Lomé – the first university of Togo. After that, he became interested in physical oceanography and went to Benin to earn a complementary master’s degree in physical oceanography. This programme, sponsored by TOTAL SA, was organized by the University of Abomey-Calavi (Benin) in collaboration with the University of Paul Sabatier Toulouse III (France). During this programme, Serge investigated wave systems in order to understand the origin of strong events (and the coastal erosion related to) in the northern Gulf of Guinea. Before joining the NF-POGO CofE-AWI, Serge volunteered for the Ministry of Environment and Forestry Resources of Togo and helped defending against coastal erosion. He has a great interest in coastal management and he wants to deepen his knowledge in observational oceanography during the NF-POGO CofE programme. He intends to undertake a Ph.D. in the near future.

Sri Nandini (Fiji) Bula!! Sri has a master degree from the Woods Hole Oceanographic Institute. She studied the seasonality in ocean acidification and its impacts on coral reefs in the western Pacific by 2100 using numerical modelling. Her previous research involved different aspects of ocean biogeochemistry; as a scientist onbroad the R/V Thomas Thompson, climate consultant at Institut de Recherche pour le Développement in New Caledonia, a marine biologist and dive master in Fiji and a fisheries oceanography modeller at the Space Oceanography Division, Collecte Localisation Satellites in France. The main objective of her research is to learn specific ocean modelling and practical observation to develop climate policies and to promote awareness in local communities of Pacific Island Countries (PICs). Her main goal is helping Fiji to mitigate the effects of climate change on rural and coastal communities such as the degradation of coral reefs and associated marine diversity. She expects to undertake a physical oceanography discipline/training which endorses her modelling abilities as well as specific hands on data collecting onbroad a scientific cruise to create a scientifically credible process and collaborations by joining an interdisciplinary community of scholars and climate science experts at AWI. She is convinced that with the best state of art climate models, libraries, scholarly articles, world renowned climate scientists found at AWI, she will achieve excellent results for her intended Ph.D. research.
Empowerment of women, a Kerala perspective
Dr Shubha Sathyendranath and Prof Trevor Platt
Plymouth Marine Laboratory, UK

Recently, I was asked to speak about empowerment of women to students of an engineering college, Adi Shankara Institute of Engineering and Technology, in Kerala, India. It seemed a good opportunity for outreach, an element of NANO activities in India. As a scientist with experience of working in India and abroad, and no record of activism, I agreed to offer a personal view, focussing on Kerala as an example. Trevor spoke to the audience on the same occasion about “oceans from space”, emphasizing the engineering aspects. Here, I present some of the ideas that came to mind during preparation of the talk on empowerment.

To me, female empowerment means the freedom to choose one’s path in life, such as is already available to men; and the chance to compete on equal terms against men for opportunities, without bias or prejudice. But with freedom comes responsibilities; freedom without responsibility would be neither desirable nor sustainable. Too often, discussions about female empowerment emphasise the rights of women, and not so much the responsibilities.

What does equality imply? We should bear in mind that diversity in human beings ensures that no two people will be equal. Specifically, there are biological reasons why men and women cannot be equal. Instead, let us emphasise equality for all before the law: female empowerment requires that the laws of the country enshrine, uphold and defend the equality of men and women. But beyond this, for true equality to prevail, everyone must accept, and subscribe to, the concept of equal freedom and equal dignity for all.

Equality in formal educational levels does not necessarily translate into equality in the work place. The best response to prejudice is the quality of work. We have to strive for excellence, in all aspects of work. The corollary is that, if we are striving for equality, then we have to be prepared to work hard. There is no short cut to success. Moreover, reservation, or affirmative action cannot be a final solution, only a stepping stone towards equality. Individual excellence, coupled with collective action, can have a powerful effect. Furthermore, an informed, educated female population effectively doubles the size of the electorate, and can be a voice for change.

How could empowerment work? If empowerment is the process of obtaining basic opportunities for marginalized people, directly or indirectly, and if the process is to be non-confrontational, then the non-marginalised have to be part of the process. Without dialogue, there is a risk that the two halves become adversaries, which would be detrimental to progress.
What about the specific example of Kerala? Since India attained independence, the literacy rate in Kerala has increased significantly, to more than 90% overall (in fact, technically, this allows the state to call itself 100% literate), and the difference between female and male literacy rate has decreased. Nevertheless, there is still a difference of some 6% between male and female literacy, so we should not be too complacent. Hand in hand with improved literacy, life expectancy in Kerala has also improved remarkably. In fact, Kerala became a subject of numerous studies as an anomalous case: high life expectancy and quality of life, even though the gross national product was low (see figure 1). Some experts relate improved quality of life in Kerala, at least in part, to improved status of women: “Despite extreme poverty, public commitment to education and health as well as to improving the status of women has in general made the population of Kerala literate and long-lived.” (Amartya Sen, 1993).

Interestingly, the male-female trends are reversed when the statistics for higher education are considered. Women now dominate in graduate and post-graduate levels, taking 67% and 78% respectively in 2006–07. I had a direct experience of this when speaking recently at another outreach event to a group of college students at Farooq College (Kerala), where Habib Rehman (see figure 2), a NANO member, is on the faculty. The students who turned up for the event were clearly dominated by women (see figure 3), and I learned that in the Zoology Department there, women are over 80% in graduate classes, and 100% in MSc. I was told that the only reason for this was excellence: women scored high marks in their exams, thereby securing the seats available for higher studies.

But what do these successes mean for the quality of life in Kerala? Since Amartya Sen wrote about extreme poverty in Kerala, the state has been enjoying an economic boom, with the gross product of the state multiplying several fold. Has greater wealth improved quality of life? This is debatable: quality of environment, and therefore quality of life, has gone down. Pollution of various kinds (plastic, noise, water quality, smog) has increased, traffic is worse. Carbon emission is higher, quality of food has decreased. Kerala has no food security.

There is a general assumption that female empowerment leads to better harmony with nature, and to a gentler, kinder world. Are Kerala women paying any attention to their environment? I return to the idea that an enlightened female population can be a powerful voice for change. It is not apparent that the women of Kerala are using their enlightened status to take better care of their land, their oceans or the air they breathe. Let us hope that the empowerment enjoyed by the women of Kerala will not stop at personal freedoms, but that they will step up soon to take their share of our collective responsibilities towards our environment.

Perhaps there are lessons here, both positive and negative, not just for Kerala, but for all of us. There is a clear need to get the people, not just the women, to think about their environment, especially in developing countries. It highlights the importance of outreach, such as envisaged in various NANO projects. Let us hope that NANO members will take their collective responsibility seriously, and be an instrument of change. And here I address not just the women, but all members of NANO. When it comes to stewardship of our planet Earth, men and women have to pull together.

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NANO REGIONAL PROJECTS
Study of Harmful Algal Blooms and other aspects of sardine habitats around the Indian Sub-continent (SHABASHI)
Nandini Menon. N.

Nansen Environmental Research Centre, India

Harmful Algal Blooms (HAB) is a topic of high societal relevance from a number of perspectives. Phytoplankton is essential for all life in the ocean and is a key player in the global carbon cycle. However, in some instances, HAB may develop, which are responsible for adverse effects on the marine ecosystem, and on the human population that depends on fisheries for their livelihood or for their source of high-protein food. This socio-economic perspective of phytoplankton processes is the focus of our project. The social relevance can be highlighted and propagated to the general public through public outreach activities.

The importance of phytoplankton studies has moved beyond the context of fisheries to include global warming, climate change and also human health. Among all marine phytoplankton species, approximately 7% are capable of forming HABs. Dinoflagellates are the most significant group producing toxic and harmful algal blooms, accounting for 75% of all HAB species. The danger of observed HAB affects every maritime country and forces it to adopt regular monitoring programmes in its territorial waters. The consequences of HABs in the Indian sub-continent region may be very dramatic, with instances of mass fish mortality and even reports of human death.

HABs are complex phenomena whose dynamics are influenced by multiple environmental factors. More specifically, blooms are driven by chemical, physical and biological factors in combination with local inter-annual meteorological conditions, which vary from one geographical location to the other.

Nine NANO members from India and two from Sri Lanka, with support from other NANO members and external collaborators designed a research project that aims to monitor Indian coastal waters (in seven representative locations) and Sri Lanka (in three representative locations) for HABs and attempt to analyse phytoplankton toxins as well as related environmental properties. Biological and chemical methods will be adopted for taxonomic and toxin characterization of HAB species, respectively. Remote sensing and numerical modelling approaches will also be used to aid the further understanding of HAB dynamics at larger scales. Efforts will also be made to understand the influence of non-harmful algal blooms in the habitat of the oil sardines (Sardinella longiceps). Furthermore, the study will strive to improve our understanding of the physiology and biology of harmful algal species isolated from these waters. The incidence of past blooms will also be studied through the analysis of dinoflagellate cysts in sediment samples. The project will take off with a training workshop at Mandapam (India) to provide a comprehensive training in sample collection and handling protocols, isolation, identification and extraction of toxins, as well as pigment analysis. All methods will be made available to other NF-POGO alumni as well as for the global community interested in similar research.

Outreach activities linked to this NANO project have already started in 2014. Ravidas Naik, the project leader, visited schools and a post-graduate college in coastal villages. He made presentations on general oceanography, on phytoplankton, how we depend on them, and on the phenomenon of HABs. These initial outreach activities attracted considerable positive responses and led to more invitations to make similar presentations. In 2015, we propose to build on these initial activities, as well as to extend the outreach activities to other areas in India and Sri Lanka. More practical sessions will be included in the outreach programmes and quiz competitions will be held. In short, the work plan justifies the meaning of the project acronym – SHABASHI – which is originally an Urdu word and is used in many Indian languages meaning “well done”!

NANO REGIONAL PROJECTS
Striking a balance with the lionfish
habitat suitability modelling and social awareness measures in the Southern Caribbean
Shaazia Salina Mohammed

Department of Physics, University of the West Indies, Trinidad and Tobago
Wikipedia: http://www.nf-pogo-alumni.org/~Shaazia+Mohammed

Thanks to the funding from the Nippon Foundation – Partnership for Observation of the Global Oceans (NF-POGO) we were able to start the first phase of the Caribbean NANO project. Our project focuses on the invasive venomous Pterios volitans (red lionfish) which is a well-established species in many parts of the Caribbean Sea and Western Atlantic Ocean. It represents a major ecological threat to reef systems in the Caribbean, and Trinidad and Tobago is also affected. Here, the lionfish negatively impacts the trophic dynamics of the coral reef ecosystem by

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altering the structure of native fish communities. On the other hand it also represents a threat to recreational divers and fishermen because of its venomous trait. As a consequence, the quality of life in these coastal communities is seriously threatened by the presence of lionfish. Eradication of the species is deemed unlikely with current available technologies. However, the best way to address this problem is to promote the control of lionfish populations by local users. Therefore the aim of the Caribbean NANO project is to develop a suitability model for lionfish at three reef sites located in Tobago. It would be a first step towards implementation of effective removal measures. Physico-chemical, parameters and micro-habitat structure data will be used as model inputs to assess lionfish population density. Data will be collected from both in situ measurements and secondary sources (i.e. satellite images). GIS based multi-criteria decision techniques will be used to develop the lionfish habitat model. The model will describe the spatial suitability based on observed model inputs for lionfish at the adult stage. Results of the present study will provide insight into which location requires intense mitigation actions to reduce the impact of lionfish. This will promote collaboration and communication between main stakeholders further enhancing social awareness in affected fishing communities. The main objectives of this project are:

1. To determine and compare temporal variations of abiotic and biotic parameters in Buccoo Reef, Man-O-War Bay and Speyside, Tobago during the dry and wet seasons;
2. To quantify and compare the spatial distribution of lionfish using discrete habitat classes derived from optimum conditions in Buccoo Reef and Man-O-War Bay;
3. To establish social awareness among main stakeholders affected by the lionfish invasion.

Project Outlook

The purpose is to investigate why there is a variation in lionfish population at different reef sites on the meso- and micro-scales. It is our hope to use this method in the future for two proposed Caribbean countries for further comparison and model validation at the macro-scale. This project will allow an increase in public awareness and to implement effective measures on the outcome of our research data. These outcomes in turn could encourage governments to review and amend relevant legislation and, if necessary, develop new regulations and policies to control lionfish and other non-native species in the near future. Finally, our results may have far-reaching implications for strengthening collaboration among governments, reef-reliant industries, civil society, and academia.

Read more about the project and its team at http://www.nf-pogo-alumni.org/Caribbean+Regional+Project

NANO REGIONAL PROJECTS

NANO South-East Asia Planning Meeting
Hosted by Faculty of Science, Burapha University, Thailand
Anukul Buranapratheprat

Department of Aquatic Science, Faculty of Science, Burapha University, Thailand
Wikilpage: http://www.nf-pogo-alumni.org/~Anukul+Buranapratheprat

A planning workshop was arranged to discuss and plan a collaborative regional project proposal for submission from the South-East Asia (SEA) region on 26 and 27 October 2014. The day before, on October 25, NANO SEA co-leaders Phan Minh Thu (Vietnam), Joseph Palermo (Philippines) and Anukul Buranapratheprat (Thailand), as well as Vikki Cheung (POGO Scientific Coordinator) met to draft the final report of the collaborative project. The workshop was hosted by the Faculty of Science, Burapha University and was had 22 attendees – NANO SEA members and friends – from countries including Vietnam, Philippines, Malaysia, Indonesia and Thailand. The key objectives of the workshop were to summarize the results of the previous year’s regional project conducted by NANO SEA members so far and to discuss future prospects to prepare a collaborative project proposal for the coming year.

The workshop was opened by Ekaruth Srisook, Dean of the Faculty of Science, Burapha University. After self-introduction of the participants, Vikki Cheung provided the overview of NANO and NANO SEA research project and purposes of the
meeting. Project co-leaders presented their methodology and results from NANO SEA project 2014. Afterwards, a representative from each participant’s institute presented their current research interests.

The project proposal discussion started in the afternoon session on the first day. The most challenging task was to combine two new member countries – Malaysia and Indonesia – into the existing project frame initiated by Vietnam, Philippines and Thailand. We all agreed that eutrophication in coastal water was one of our major concerns in SEA region. The session concentrated mainly in defining study sites in SEA region, parameters and methods to be applied for eutrophication assessment. On the second day of the meeting, the project proposal was drafted – including budget and plans for project completion. After fruitful discussions, the title of the proposal became “Eutrophication in the Coastal Waters of SE Asia: Monitoring & Capacity Building”. The main objectives of the project are to:

1. Determine the level of eutrophication in each new study site and evaluate the application of UNTRIX and the application of the LOICZ and/or hydrodynamic models such as Delft 3D for estimating water residence time;

2. Initiate a coastal water environmental monitoring system for the new participating members, expanding the methods applied by NANO SEA Regional Research group during 2014;

3. Strengthen human capacity for environmental management and expand the NANO network in SEA countries by knowledge-transfer.
The Nearshore-Hydrodynamics Group (NHG) was created in December 2012 with the aim of strengthening the observation of coastal zone hydrodynamics and promoting long-term collaboration between the members of NANO-Africa. Currently, NANO-NHG is involved in the setup of coastal observatories at selected eroding sites in Port Bouët (Abidjan, Ivory Coast) and the Bay of Aghir (Gulf of Gabes, Tunisia). The observatories will provide meteorological (wind speed and direction, air temperature, relative humidity, barometric pressure and dew point) from a weather station (Gill instruments, UK) and in situ wave and tide data from a tide-wave gauge (RBR, Canada).

The numerical wave simulation package Delft3D-WAVE will be used to model the propagation of offshore wind-generated waves towards the coast. Data from the observatories, large-scale WaveWatch III model and wind from NCEP/NCAR reanalysis, will be used to prescribe boundary conditions, initialize and calibrate the model. A workshop dedicated to training NHG members on the various aspects of working with the Delft-3D modelling suite will be held at the end of 2015 at the Council for Scientific and Industrial Research (CSIR) in Stellenbosch, South Africa. Regional participants will receive an intensive training on the theory and application of coastal hydrodynamics modelling (flow and waves) using the process-based numerical modelling system Delft-3D (Deltares Systems, The Netherlands). The training will be given by a Delft-3D expert (Marine and Coastal Systems at Deltares, The Netherlands) and will consist of a series of theoretical lectures and hands-on practical sessions on the use of Delft-3D to simulate flow and wave dynamics and their impact on the sediment load transport at a number of pilot sites including some of the participants’ countries. Moreover, attention will be given to setting-up a coastline model (i.e. UNIBEST-CL+ or similar) to simulate long-term morphological changes forced by the output of a Delft3D-Wave simulation.

Figure 1 - Observatories equipment. Left: Tide-wave gauge (RBR-Gologal, Canada), right: weather station (Gill MetPak, UK).

Figure 2 - Deployment sites for the Met-Ocean observatories in Ivory Coast (top panels) and Tunisia (bottom panels).
The Latin America–NANO regional project “Variability in phytoplankton pigments at the Antares–ChloroGIN time-series stations” is now at the end of its third year (March 2015). During the past year we have been working on maintaining the communication among the participating countries. More specifically, a new country, Ecuador, joined the project, and we organized a “hands-on” training workshop to implement a common protocol for High Performance Liquid Chromatography (HPLC). This common protocol is to be used and shared among participating members. To maximize the benefits, this workshop was combined with the NF–POGO Centre of Excellence Regional Training Programme (CofE RTP) held in Ensenada, Mexico (see article at page 11). The focus of this regional training was on capacity building on ocean water optical properties and ocean colour remote sensing. This training presented an excellent opportunity to meet all participants and define future tasks, such as an inter-calibration exercise. With this exercise we aimed to develop a better definition of the quality and reproducibility of the data generated by each laboratory. We also attempted to define the feasibility of establishing regional centres that can support participating countries without HPLC systems that meet the minimum requirements of the international community. In addition, we agreed to publish results gathered during the three previous years of the project and we drafted an outline for a manuscript. We also agreed on specific milestones and deadlines for the upcoming year.

Educational gadgets design contest

“Education is not a problem. Education is an opportunity.” ~ Lyndon B. Johnson

We would like to invite NANO alumni to take part in a contest on the design of original Ocean Science outreach and educational tools such as rulers, notebooks, magnets, bookmarks and any other ocean-related awareness gadgets.

Best items will be selected and included in “Ocean Science Outreach Kits”. Such kits will be provided to NF-POGO alumni for outreach activities in their home countries. These materials will be posted online on the NANO website where it may be accessed by NF-POGO Alumni and by the general public (teachers from schools and colleges, governmental representatives and others).

Please send your original design to monikao@iopan.gda.pl no later than 15th of June 2015.
Invitation for outreach presentations

Dear Alumni,

Public ocean literacy remains an unresolved issue in many countries, especially in developing countries. Communication about the oceans and ocean science to the wider community remains a daily challenge for ocean science educators worldwide. The general public often considers seas and oceans as a hostile, remote environment or a place for leisure only. They have little understanding of the services that the ocean provides to us and the threats it is currently experiencing. The Public Ocean literacy initiative was added to the existing activities of NANO in 2013 to encourage an active participation of NANO members in propagating the awareness of ocean science and marine issues to young people and the general public.

So far, we have made good progress, putting together a catalogue of educational presentations that are translated and available in several languages. They are currently on the Outreach webpage (http://www.nf-pogo-alumni.org/NO_Catalogue). However, we are always looking for more contributions to successfully fulfil the aim of effective education and knowledge dissemination, which is a moral duty of every scientific organization. We encourage NANO members to get involved in outreach programmes through ocean education in schools, seminars, writing of short articles to local newspapers, etc. It is our responsibility as scientists to inform the general public about the ocean and threats to the aquatic ecosystems, as well as to mentor young people in the field of ocean sciences.

Join us and get actively involved with ocean science outreach! We want to increase the awareness on ocean science to young people and the general public by the establishment of an online catalogue of teaching materials, which will be used by alumni and friends of NANO for teaching ocean sciences.

If you are interested in sharing some outreach material please follow our guidelines for preparing presentations:

**Topic:** Any topic of your interest, relevant to ocean science (e.g. biological oceanography, chemistry or physics, climate change or pollution). Topics should be well-explained in simple informal words to allow good understanding. It can explain a process, describe a group of organisms, interactions between biotic and abiotic parts of the ocean, or any issue related to the ocean.

**Target group:** Select a target group of preference (e.g. ages 6–10, 11–13, 14–18 or adults). Please define the age group you think it will be suitable for.

**Format:**
1. Power point presentations (15 to 30 minutes or 30 to 45 minutes long);
2. Posters;
3. Animations, videos or any other materials.

**Security:** Your authorship will be secured and acknowledged (only PDF versions of the presentation will be published).

**Submission:** Please send your material to Monika (orchowskam@gmail.com) for approval and publication on the NANO website.

With regards,

Monika Orchowska
Outreach Team
http://www.nf-pogo-alumni.org/NANO+Outreach
Phenology indices and their importance for coral reef biology
A web-based lesson on ocean-colour observations in the Red Sea
Dr Marie-Fanny Racault
Plymouth Marine Laboratory, UK

Coral reefs are among the most biologically diverse ecosystems on Earth. They occupy less than 0.1% of the world’s ocean surface, and yet they host 25% of all the marine species (Spalding et al., 2001). Coral reefs deliver valuable and vital ecosystem services. They offer a source of food, coastal protection, and employment through fisheries, recreation, and tourism for millions of people around the world.

However, coral reefs are fragile ecosystems, facing serious threats from climate change, marine acidification, destructive and unsustainable fishing practices, and water-polluting land-use activities (Hoegh-Guldberg et al., 2007). The Red Sea (Figure 1) hosts some of the most pristine coral reefs that have adapted to live in one of the most saline and warm seas in the world. In addition to being a very warm environment, the Red Sea is experiencing a particularly fast increase in temperature, which began abruptly in the mid-1990s (Raitos et al., 2011). These unique conditions make the Red Sea an excellent laboratory for studying the warming on marine organisms.

Microscopic marine algae, called phytoplankton, provide an important source of food for coral reef ecosystems. They are grazed on by the larvae of many species, including fish, crustaceans and molluscs (Yahel et al., 1998; Wild et al., 2008). The magnitude and timing of phytoplankton availability are known to play a fundamental role in the survival of larvae (Platt et al., 2003; Lo et al., 2011). Over the past two decades, remote-sensing measurements of ocean colour have provided unique information on surface marine phytoplankton, allowing us to monitor their distribution at high temporal (less than 1 day) and spatial (less than 1 km) resolutions. The colour of the ocean is a good indicator of the primary photosynthetic pigment found in phytoplankton, chlorophyll-a. The concentration of chlorophyll-a varies seasonally following the growth and decline of phytoplankton populations. The seasonal development of phytoplankton populations is defined as the phytoplankton growing season. A suite of indices has been proposed to quantify phytoplankton seasonality (Platt and Sathyendranath, 2008) and to provide support to investigations on the composition, structure and functioning of the marine ecosystem (Racault et al., 2014).

In the Red Sea, general ecological research and long-term large-scale biological datasets are rare, with the latter mainly limited to satellite-based observations of ocean colour (Raitos et al., 2013, 2015; Racault et al., 2015). Hence, there is an important need to promote outreach activities to make the use of remote-sensing products readily accessible to coral reef students and researchers. In this context, we have developed, in collaboration with Dr. Dionysios Raitos from PML, a web-based lesson to introduce ocean-colour observations and phenology indices to non-remote-sensing experts. The lesson was written as part of the European Space Agency (ESA) Bilko Learn Earth Observation (LearnEO) lesson writing competition and it was awarded first prize (Figure 2). The data and lesson activities are available publicly online at http://www.learn-eo.org/lessons/11/.

Figure 1 - Location of the study region

Figure 2 - Award ceremony at the European Space Agency Centre for Earth Observation in Frascati, Italy
The lesson uses ESA Ocean-Colour Climate Change Initiative (OC-CCI) dataset (http://www.esa-oceancolour-cci.org), which was released in 2014 by the OC-CCI team, led by Shubha Sathyendranath at PML. The dataset represents the most complete, stable, and error-characterized global ocean-colour time-series based on merged SeaWiFS, MODIS and MERIS satellite observations. The progress made in the OC-CCI project has permitted, in particular, to improve coverage of remotely-sensed chlorophyll measurements in summer months in the Arabian Sea and southern Red Sea regions.

In the web-based lesson, students can learn to visualize remotely-sensed chlorophyll concentration on a map, and to make an animation to see how phytoplankton concentrations change from one season to the next. They can also use bathymetry and coral reef datasets to locate and characterize the distribution of coral reefs in the Red Sea. Then they find out how to calculate and map timing of phytoplankton growth, and understand why this information is key for fisheries management (Figures 3 and 4). Furthermore, the activities presented in the lesson can be also applied and extended to other oceanic regions in the world. I really hope that the lesson will be useful for educational and research purposes. I find it very inspiring to work with colleagues from developing countries and I wish to help to strengthen capacity building in the future through further use and development of educational resources through collaborations.

References

Further information about phenology indices and their importance for coral reef biology such as presented in the web-based lesson are provided in the open access peer-reviewed paper:

Figure 3 - Screenshot of the LearnEO! lesson activity showing plots of chlorophyll concentration (left panels), a map of chlorophyll concentration (central panel), and a bathymetry map and coral reef data (right panel). The colour scale on the left hand map indicates the chlorophyll concentration. The colour scale on the right hand map indicates the bathymetry of the Red Sea, and each white dot represents the position of a coral reef.

Figure 4 - Screenshot of the LearnEO! lesson activity showing a map of timing of initiation of the phytoplankton growing period. The colour scale indicates the week when the phytoplankton growing season starts.
Between September 21st and October 3rd, 2014, the Alfred Wegener Institute for Polar and Marine Research, jointly with the Sir Alister Hardy Foundation for Ocean Science organized the summer school entitled “The importance of time series data for assessing the biological and societal impacts of climate change”.

As dealing with any time series requires a lot of experience and a lot of different issues have to be kept “under the same hat”, the aim of the summer school was to familiarize participants with the different challenges of marine time series. We took a holistic approach by including modules dealing with different aspects of time series research ranging from data collection to data archival and analyses.

During the event the participants were introduced to very different time series ranging from plankton time series – such as Helgoland Roads, or the SAHFOS Continuous Plankton Recorder survey – to hydrographic time series. They also learnt about time series that are run using molecular tools. Trainees had ample opportunity to study and run different statistical techniques to analyse time series data sets. This also included some multivariate spatial analyses so that time series with different sites and depths could also be analysed. Most analyses were run in R – an open source and free system for statistical computing and graphics. This enables all participants, including those without access to expensive statistics software, to re-run different tests after returning to their home countries. Participants also joined a short oceanographic cruise to sample plankton and handle different equipment (e.g. a Ferry Box). Finally they spent some time discussing how time series might be employed to study the other impacts (e.g. climate change and pollution) in coastal systems. This included a practice session on how to devise a time series for different purposes and how to convince local policy makers the need for continued research funding.

All participants produced short projects with their own data or data provided by us so that they could apply what they learnt in a context relevant to them. Two NF–POGO alumni, Lailah Gifty Akita and Elisee Toualy, were amongst the participants in this summer school and we are very grateful for the support and funding provided by NF–POGO to ensure their participation.

Report on the Joint AWI-SAHFOS Summer School
Lailah Gifty Akita
Institute for Geosciences, Friedrich Schiller University of Jena, Germany
Wikipage: http://www.nf-pogo-alumni.org/~Lailah+Lartey-Antwi

Reasons for participation
My long-term career goals are (i) to study macrobenthos ecology; (ii) contribute to benthic invertebrate biodiversity data in Ghana, West Africa; (iii) monitor coastal water quality using biological indicators; (iv) enhance environmental awareness on global issues (e.g., impacts of ecological degradation, climate change); and (v) policy development towards marine and coastal ecosystem management.

I believe in lifelong learning and seeking new opportunities to increase my knowledge in the field of marine science. My interests include biological oceanography, macrobenthic ecology, climate change effects on macrozoobenthos, palaeo-ecology, palaeo-climate and outreach. My ability to be a team player, combined with passionate desire for learning, and curiosity for scientific adventure were part of my motivation for participating in the course.

Participants and course structure
Twenty four young scientists from across the world participated in the course. They were from Croatia, Denmark, Egypt, Faroes, Finland, Ghana, Greece, Germany, Iran, Ivory Coast, Italy (3), Mauritania, Nigeria, South Korea, Spain, United Kingdom (4) and United States (2).

Seventeen lecturers provided insights on diverse topics, such as biological to physico-chemical oceanography, molecular biology, scientific outreach, socio-economics, among others.

Lessons learnt
The health and viability of marine and coastal ecosystems are under threat by human activities including climate change and chemical pollution. There is still little known about the consequences of climate change and the biological response. It is necessary to understand the effects of climate change on marine and coastal ecosystems and living resources to plan...
for adaptive management strategies. Any change in the ecosystems can be best observed through consistent monitoring of environmental variables (i.e. biological, physical, chemical, hydrological) and human activities over long period of time. Time series assessment of biological and societal climate impacts is urgently needed for sustainable management of the aquatic ecosystems.

Participation in the joint AWI-SAHFOS time series summer school augments my intellectual know-how on time series observations, sampling design, statistical analyses (data preparation, transformation and visualisation), data management and archiving (PANGAEA), marine biodiversity, researcher–stakeholder interactions, ecosystem functions, bioinformatics, molecular data, etc.

It was an opportunity to (i) learn about time series in oceanography; (ii) perform ocean sampling onboard the R/V Uthörn and zooplankton analysis at AWI’s laboratory; (iii) enhance our understanding of the need for integration of social science in scientific research and researcher–stakeholder interactions; (iv) to enhance our knowledge on statistical and biodiversity analysis; (v) acquire the hands-on experience with the use of free data analysis softwares (e.g. R, Resampling Add-in for Excel, Ocean Data View, Pan2Application, PanTool, Latlong Converter, Pan Plot, EstimateS, World Register of Marine Species); (vi) participate in an educational tour to Helgoland Aquarium, Rocky Island (unique geology, red carbonate with geological records) and Dune Island (seals, sandy beaches, plants, lakes, birds, ducks, etc.); and (vii) to network with other international scientists.

The courses on statistics, marine biodiversity and data archiving are useful for my current research on ecology of ostracods in a high-mountain ecosystem. The lessons learnt during the course will be also useful for the implementation of an upcoming post-doctoral research project “Monitoring Ghanaian coastal water quality using biological organisms”.

Personal impressions

Helgoland (in English “Heligoland”) is a hotspot for geologists and natural scientists due to its unique geological features – cliffs formation and fossils – and due to its diverse flora and fauna. It is located in the German Bight, about 60 km north-west offshore the town of Cuxhaven. Helgoland is divided into two islands: the main, Rock island with the eye-catching red sandstone cliffs that rise about 50 m above sea level and the smaller, flat island called “The Dune”, east of the main island with sandy beaches instead of high cliffs. Together they form an area of about 1.7 km². The island can be reached by boat (ferries from Hamburg via Cuxhaven, Wilhelmshaven, Bremerhaven or Sylt) or by plane (airport on Dune island).

Helgoland (Rock Island) is a habitat for a diverse array of living organisms – mammals, birds, insects and plants. Interesting organisms include wild rabbits (Oryctolagus), grey seals (Halichoerus grypus), seabirds (Razorbill, Gannet, Guillemots, etc.). Cattle and poultry on the island include sheep, goats, geese and ducks. The sandy beaches of Dune Island serve as habitats for marine molluscs and seaweeds. The ecosystem of Helgoland fosters its own unique natural ecological mosaic and oasis. The relentlessly working forces of wind, waves and tides constantly shape the island’s landscape. In order to prevent coastal erosion by steady waves and repeated storm surges, extensive coastal protection measures have been undertaken. Still the fresh traces of land slide are visible in several locations along the steep cliff.

Helgoland is an excellent place for scientific learning of the marine ecosystem. It provides an exploration of unique endemic species of plants and animals of the North Sea and the webs of interdependence that connect them. Helgolanders are organised, friendly and glad to welcome visitors to its ecological wonders and glimpses of interlinked rhythms of nature. Helgoland is a tourist destination since its reintegration into Germany in the 1950s. Helgoland’s economy further benefits from its declaration as a duty free area. The historical, cultural and economic significance together with its legends of saints and pirates, wreckers, fishermen, hunters and pilots make the island an unique experience.

Leisure readings


Garrett Hardin (1968) The Tragedy of the Commons Science, 162: 1243–1248


Participants and instructors of the Summer School
NN What is your educational background and how long have you been working in ocean science?

ES I finished my bachelor in oceanology in 1985 in the Faculty of Marine Science in the State University of Baja California (Universidad Autonoma de Baja California). Immediately I started my Master in Science program in Biological Oceanography in the same University where I was a member of the first generation of this program, which ends in 1987 with the second graduate. In 1990 I was a member of the first generation of a PhD program in the UABC. In this PhD program in coastal oceanography, I made workshops and research visits in different international Universities and research centres like Bermuda Biological Station, University of South Florida, Dalhousie University, Bedford Institute. In 1994 in December I defended my PhD thesis where I was the first graduate of the program and the first graduate of a PhD program of the UABC. Throughout my career, I have tried to participate frequently in international workshops, first as a student (in the beginning) and, subsequently, as an instructor.

NN You have attended NF-POGO VP course in 2006 and Regional CoE in 2009 in Brazil. This year, you were one of the instructors at the Regional CoE in Mexico. In your opinion, what is the relevance of this type of training in pursuing a scientific career? How was your career impacted by these trainings?

ES The ocean is a very complex system. To understand the ocean dynamics, we need people that develop research with different areas of expertise. The principal idea of these kinds of workshops is try to make a link with these people to join in a multidisciplinary approach. At this point it is important to note that these Alumni can be young researchers or researchers with expertise in another knowledge generation line. When these Alumni return to their research centre, they can take the role of a knowledge dissemination cell. The result is that the NF-POGO training programmes have a greater influence and could touch more people that stretches beyond the Alumni.

My academy education helps me to understand the marine processes using biological, physics, chemistry and geological approaches. In my personal point of view NANO program is focused on this principal goal and development of young scientists occur in a very natural way NF-POGO’s efforts are directed to understand the marine system using interactive processes and approach.

Would you like to propose someone to be profiled as a prominent alumnus? Send us a name and a reason and we take care of the rest! Send an e-mail to lilian.krug@nf-pogo-alumni.org with the subject NANO Profile.

NN You are the coordinator of the Antares Network, a network of 11 time-series stations dedicated to the study of long-term changes in coastal areas of Latin America. What are the main benefits of such collaboration for individual time-series stations? And what is the main scientific significance of the network as a whole?

ES The Antare’s goals are

- Operational Goal: Antares provides an excellent venue to calibrate remote signals from a variety of sensors with field data from the network of time series stations around Latin America. This represents an important contribution towards ‘Operational Oceanography’.
- In Latin America this kind of Monitoring Network has extra Societal Benefits like:
  - Contribute to fill a gap of information in Latin America. Integrating continental-scale satellite images with the knowledge gained from in situ time series studies.
  - To develop the science required for coastal ecosystem management.
  - Promote long-term cooperation among Latin American countries, and improve north-south dialogue within America.
  - Approach is cost-effective, allowing the sharing of limited resources, exchange of information, and transfer of technology between the partners.
  - Capacity building is a major target, expected to diminish gaps in scientific and technical expertise through the collaboration established.

Contact us: sebastian.krieger@usp.br, info@nf-pogo-alumni.org, lilian.krug@nf-pogo-alumni.org
NANO website: www.nf-pogo-alumni.org
Since 2012, the Latin America NANO Regional Project runs in partnership with the Antares Network, collaborating in training members for high quality data acquisition and analysis. Could you please tell us more about this partnership? Did this partnership result in any benefits/changes for the Antares network?

The participation of Antares in the LA-NANO project marks a very important time in our network. This Project (with the different chapters 2015-Ensenada, 2014 Ensenada, 2013-Cariaco, 2012-EPEA) is focusing on obtaining high quality data. The idea is that in situ monitoring systems are not cheap and the Antares’s goal is to take fewer samples but with high quality data. In the LA-NANO project the Antares Network are showing the capacities to generate this high quality data, comparable with the quality of NASA’s data.

The most significant results of LA-NANO’s project are:
1. Intercalibration between different laboratories.
2. Standard methods in the field, in the lab and data management.
3. The LA-NANO project has given us the opportunity to purchase supplies and some other items that in some countries can be hard to found.
4. We have refined the sharing of resources and equipment.

The most important aspect is that if we have a limited economical resource, we can be more efficient by using very high quality data and sharing resources and equipment.

You are an active member of NANO since its formation, in 2010. How would you describe NANO’s progress? Do you have any wishes for the future of the network?

The NANO project has two important points:

1. The first one is that in Latin-American countries, the administrative processes can be complex due to the internal rules relating to the use of international economical resources. LA-NANO, since the first chapter (2012-EPEA), provided a means for more expedient and efficient use of international resources. This is a key to making short (in time) projects productive by setting achievable goals.

2. In the same way, each country has very clear rules to support the research and the national politics agenda. In these situations a single long term project cannot be supported with national funding. NANO helps to provide possibilities to develop these kinds of observations that in the long term will provide very valuable data and human capacity.

I know that the capacity building process takes a very long time. In this case, I have witnessed the evolution of NF-POGO training into more complex topics. Current topics involve more dynamic interactions and possibly more.

A program with a several short workshops (each lasting one month) focused on specific subjects to give the participants time to assimilate the vast amount of information that is provided. That was the way the Brazil’s Visiting Professorship (2006) was operated with two phases, each with a time interval between them. I think this scheme was very successful and joined students in relationships and friendships to this day are very strong and are the basis of several joint projects.

A suggestion that I propose is that in the outputs such as scientific papers presented at conferences and other academic events, NANO members that are co-authors could state in the Acknowledgements their gratitude to NANO for the support and opportunities provided to us in the training that has enabled further development of our scientific knowledge.
Mein Name ist Atul

Here is a funny memory about this when I was giving my introductory presentation in Helgoland. I said “Mein Name ist Atul and you can call me Atul” and everybody started laughing. I was surprised what is funny in that because I didn’t realize that I had forgotten to say my full name. But in the end was happy to see that people enjoyed my presentation and I felt that I was representing my country.

Well there was one day when I applied for the NF-POGO program and was not sure about getting selected as it was very competitive. Ten scholars from all over the world!!! I was a little bit afraid but also optimistic as my friends reminded me: “Be positive brother it is your blood group everything will be fine”. My blood group is B+ (B-positive) and they used to tease me as well as give me hope with this joke. Now finally I am here writing my article for the NANO newsletter.

Before I came here I was sad to leave my friends and family. But soon I found new friends and now our current group of Pogonian trainees has become my family. I am enjoying long, tiring weekdays of work and good relaxing weekends with them. I am enjoying different cuisines from different parts of the world each day. We, as a group, are enjoying music over dance. It is my first time on an island and I completely love it. I have good memories of celebrating the Indian festival of light – we call it “Deepawali” – with our group in Bremenhaven Hostel. In Helgoland, I had an amazing Christmas and New Year too. It is astonishing for me to live in Helgoland because my home is far inland. Two years ago, the last time I saw the ocean, I never would have thought that I would be living on an island surrounded by seawater.

I was born in a small village in India called Ghanshyampur, which is located in Jaunpur district. Now my home is in Lucknow – called “City of Nawabs” (Governors from Mughal Empire). It is a historic and multicultural city. After finishing my schooling from my home town I did my bachelors in information technology (IT) from Gautam Buddha Technical University. During my bachelor thesis I worked with Radio Frequency Identification (RFID) tags and made web application to register employee attendance for businesses. It was designed to calculate working hours for each employee and based on that, calculate his/her salary. I finished my masters in climate science and technology at the Indian Institute of Technology in 2014. Soon after I started my Ph.D., but I decided to leave it after being selected for the NF-POGO Centre of Excellence training. In my masters thesis I studied the variability of the Antilles current, in the North Atlantic, forced by in-situ and NCEP-NCAR reanalysis winds. The topic for my Ph.D. thesis was the ocean circulation in the Bay of Bengal near the Odisha coast. Under the NF-POGO program I am learning new ways to observe the oceans. First I only knew about the physical aspect of ocean circulation, but now I also have some biological and chemical insights on the ocean. I am enjoying learning with people from different backgrounds. As part of the CoFE training, I am interested in using paleo-climate proxies (e.g. ice and sediment cores) to understand the dynamics of the past climate using numerical models. I am especially interested in understanding the impacts of sea-ice melting in ocean circulation. I am new in my field so I am curious to learn new things and I think the NF-POGO CoFE training will be an important milestone in my career.

I like to do community work and, for the longer term, I would like to work with underprivileged children to provide them basic education so that they can get better opportunities. Apart from all I am a sportsperson. I played hockey at regional level in my country during my school days and basketball for my college team during my masters. I enjoyed playing in a volleyball competition on the last day of 2014 – and we won. I am looking forward to trying ocean sports like surfing in Helgoland.
Coastal Reforms: an Untold Truth of Jambudwip Island in Indian Sundarbans

The term coast represents a long geographic strip where land interacts with ocean and forms a very complex and resourceful ecosystem. Coastal reforms, such as erosion-accretion and land-use changes due to climate change and anthropogenic activities facilitate the transformation of the region into a very dynamic segment on Earth. Generally, these transformations are mostly regulated by continuous physical interactions between land, sea and atmosphere.

India’s coastline stretches a distance of about 7516 kilometres and the coastal zone is characterized by a variety of ecosystems including mangroves, lagoons, coral reefs, sea grasses, salt marshes, estuaries and creeks. (Gopinath, 2010). Indian Sundarbans, a UNESCO world heritage site, is the world’s largest natural compact mangrove patch on Earth and often known as the Hugli-Matla estuarine system. The Ganges – a trans-boundary river of India and Bangladesh – drains the southern part of the Himalayas and joins with the river Brahmaputra before emptying into the Bay of Bengal through a huge network of tidal creeks. River Hugli is the perennial tributary of Ganges and Matla is one of the major tidal creeks of this network. The estuarine system is characterized as a semi-diurnal meso- to macro-tidal zone and consists of many smaller islands. These islands are frequently affected by tropical cyclones. Jambudwip is one of the southernmost islands in the Indian part of Sundarbans, located inside the Bay of Bengal, at the mouth of River Hugli, approximately 10 kilometres offshore (figure 1).

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In the present study, we report subsequent loss of island area and sandy beaches using multi-dated satellite images (1986, 1996, 2009 and 2014) from Landsat TM, LISS III (Resourcesat-1) and Landsat 8 (table 1). The changes in geo-morphological features, such as sandy beach areas and the coastline of the study area, are illustrated in figure 2. For each year, the island perimeter and sandy beach area were estimated using the available satellite images. Significant area loss is very much prominent. In 1986 the island area was 8.02 square kilometres. One decade later, in 1996, the island lost a significant area in the southern part, reducing its area to 5.465 square kilometres. In 2008, the total area was 4.979 square kilometres. More recently, analysing the Landsat 8 image for 2014, the total area was 3.866 square kilometres (table 2). A similar trend covered with fine-grained sediment types such as clay and silt. The significant morphological transformations might be responsible for hampering the normal nesting preferences of Olive Ridley sea turtles.
Figure 2 - Temporal evolution of the coastline in Jambudwip island estimated from satellite images.

in severe sandy beach declining has been observed (table 2) and the recent estimate of sandy beach area in Jambudwip island was 0.065 square kilometres in February 2014.

A reduction in the sand spit area may significantly affect the nesting patterns of Olive Ridley turtle and may also drastically reduce the number of nests of this migratory endangered species (Kumar et al., 2014). Hence, it may be conferred from this study that coastal reforms are the major factors that trigger the decline of Olive Ridley turtles in Indian Sundarbans.

Table 2 - Evolution of the total island area and sandy beach area in Jambudwip.

<table>
<thead>
<tr>
<th>Area (km²)</th>
<th>1986</th>
<th>1996</th>
<th>2009</th>
<th>2014</th>
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<tr>
<td>Total island</td>
<td>8.020</td>
<td>5.465</td>
<td>4.979</td>
<td>3.866</td>
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<tr>
<td>Sandy beach</td>
<td>1.696</td>
<td>1.104</td>
<td>0.202</td>
<td>0.065</td>
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</table>

References


## Opportunities announcements

<table>
<thead>
<tr>
<th>Event</th>
<th>Details</th>
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<tr>
<td><strong>Floating Summerschool with RV Polarstern</strong></td>
<td>Bremerhaven, Germany to Cape Town, South Africa</td>
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<td>This exciting cruise will bring together participants from Europe and South Africa, through a joint cooperation between the Alfred Wegener Institute (AWI), the Strategic Marine Alliance for Research &amp; Training (SMART), the Nippon Foundation (NF) and the Partnership for Observation of the Global Oceans (POGO).</td>
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<td>Deadline: 7 June 2015</td>
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<td>Contact: <a href="mailto:Claudia.Hanfland@awi.de">Claudia.Hanfland@awi.de</a></td>
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<td><strong>SOLAS Open Science Conference</strong></td>
<td>Kiel, Germany</td>
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<td>The Surface Ocean–Lower Atmosphere Study (SOLAS) is an international and interdisciplinary research project on biogeochemical-physical air-sea interactions and processes. With its Open Science Conference, SOLAS offers the ideal programme for scientists who wish to learn and exchange about cutting edge research in the field and present their own findings via a talk or a poster.</td>
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<td>Deadline: 27 May 2015</td>
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<td>Contact: <a href="mailto:solas-osc@geomar.de">solas-osc@geomar.de</a></td>
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<td><strong>Ocean Remote Sensing Synergy Summer School</strong></td>
<td>Brest, France</td>
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<td>This is a unique opportunity for graduate students, doctoral students, post-docs, young researchers, senior researchers and practitioners as participants will not only benefit from direct interaction and discussions with the lecturers, but will also have the possibility to present the results of their research, and to interact with their scientific peers, in a friendly and constructive environment.</td>
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<td><a href="http://conferences.telecom-bretagne.eu/synergy_summer_school_2015/">http://conferences.telecom-bretagne.eu/synergy_summer_school_2015/</a></td>
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<td><strong>Polar Data Forum II ‘International Collaboration for Advancing Polar Data Access and Preservation’</strong></td>
<td>Ontario, Canada</td>
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<td>27 – 29 October 2015</td>
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<td>Polar Data Forum II will build on successes of the first International Polar Data Forum that identified priority themes and key challenges in the domain of polar data management. The Second Polar Data Forum will accelerate progress by establishing clear actions to address the target issues, including meeting the needs of society and science through promotion of open data and effective data stewardship, establishing sharing and interoperability of data at a variety of levels, developing trusted data management systems, and ensuring long-term data preservation. The Forum will be held in conjunction with annual meetings of the Arctic Data Committee of the International Arctic Science Committee and Sustaining Arctic Observing Networks and the Standing Committee on Antarctic Data Management of the Scientific Committee on Antarctic Research (SCAR), effectively creating a Polar Data Week.</td>
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<td>Deadline: 1st July 2015</td>
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<td>Contact: <a href="mailto:ccin@waterloo.ca">ccin@waterloo.ca</a></td>
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<td><a href="http://www.polar-data-forum.org/">http://www.polar-data-forum.org/</a></td>
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