Introduction to POGO

POGO's Mission: The Three Pillars

POGO — Partnership for Observation of the Global Ocean

1 Innovation in Ocean Observing

POGO seeks to lead innovation and development of the crucial components of the ocean observing system. To this end, POGO supports projects proposed by POGO members, which aim to identify and fill gaps in global ocean observation. Innovation is also supported via the NF-POGO Alumni Network for Oceans (NANO).

Three of POGO's currently-active projects are summarised below. Scan the QR codes for more details.

Biological Observations Working Group

The POGO Task Force on Biological Observations, set up in 2017, was charged with identifying the policy rationale for biological observations of the ocean, developing a census of approaches to ocean biological observation, and suggesting ways to foster intercalibration, intercomparison and linkage to existing time series of ocean observations.

In May 2019 the POGO Biological Obs Working Group held a Workshop on Machine Learning and Artificial Intelligence in Biological Oceanographic Observations. This three day workshop aimed to educate the POGO community about ML/AI as it is currently being applied in biological oceanography. It covered current state-of-the-art analysis techniques in three broad areas: **acoustics**, **imaging**, and **genomics**, and included hands-on tutorials, hosted by domain experts, with a focus on data pre-processing and organisation. The workshop concluded with discussions on the direction of ocean observation in the age of big data.

Participants and tutorial leaders at the POGO Machine Learning/Artificial Intelligence for Biological Observations Workshop in Belgium, May 2019. Photo credit: Rob Ross

A second workshop, on **eDNA**, is planned for 2020.

### SAGITTA - Social AGITation for Temperature Analysis

The SAGITTA project aims to implement a citizen science approach for consistent and regular temperature profile data collection in the coastal ocean. This requires development of a new simple-to-use, cheap, yet scientifically reliable probe which may be distributed among representatives of the general public. In order to allow implementation of the Project, the new system needs to be realised: probes should be operated and connected to the Internet via smartphone. This will provide ease of use, geolocation, data transmittance and access.

SAGITTA has been supported by POGO and NANO since 2017. The aim for the first year was planning of the Project implementation, while the main goal in 2018 and 2019 has been the preparation of the probe for production and development of the system (probe – smartphone application – web portal).
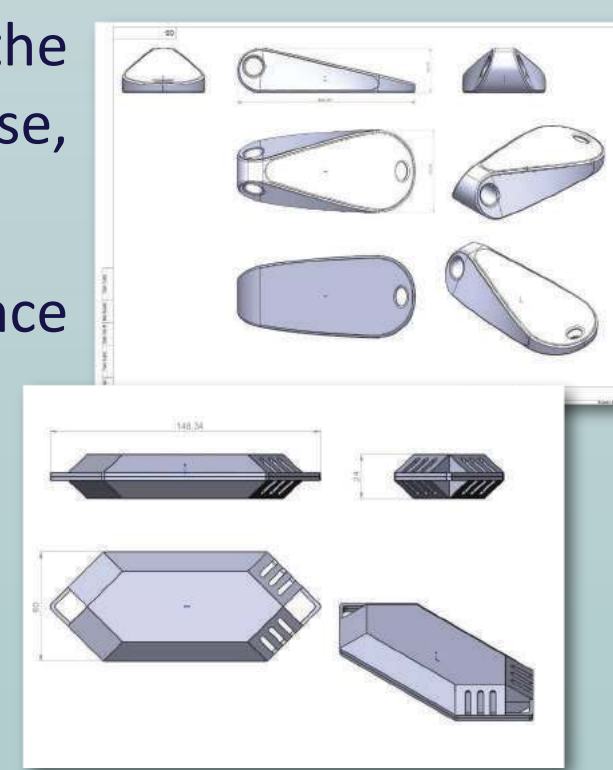
Two potential designs for the Sagitta prototype

OpenMODs

POGO's OpenMODs project has the overarching goal **"To devise ocean sensors and monitoring devices, globally available to all and not just to a privileged few."**

With the majority of ocean-going instrumentation being expensive to acquire, difficult to deploy and costly to operate, whilst the majority of global coastal areas belong to developing countries, such observations are limited by access to user-friendly, low cost and easily deployable instrumentation.

To address this issue, the OpenMODs project has two main goals:

(i) conceive an "easy-to-use" flexible and affordable oceanographic versatile platform (free-floating or moored) which is able to accommodate different sets of sensors, and

(ii) prepare an international realisation programme with the early engagement of industrial partners through a series of workshops.

Attendees at an OpenMODs workshop in Cabo Verde. Photo credit: F Beckman

2 Capacity Development

Lack of trained personnel is considered to be a major obstacle to development of a global ocean observing system. Therefore, a central element of the POGO agenda is capacity development and training.

POGO has developed an extensive array of training and education activities targeted primarily at scientists from developing countries and those with economies in transition. The main programmes are summarised below:

NF-POGO Centre of Excellence

In collaboration with the Nippon Foundation, POGO established the NF-POGO Centre of Excellence in Observational Oceanography, now hosted by the Alfred Wegener Institute for Polar and Marine Research. This is an intensive training course for young professionals at the post-graduate level, ten months in duration, with an intake of ten trainees per year.

2018-19 NF-POGO CofE Scholars Photo credit: E. Brodte

Shipboard Training & Ocean Training Partnership

POGO coordinates the Ocean Training Partnership, whose objective is to pool infrastructure, resources and expertise to provide marine science graduates with offshore technical skills and experience onboard research vessels, whilst building capacity in ocean observations.

NF-POGO offers fellowships to early-career scientists to receive hands-on training and shipboard experience, and we invite the principal scientists of research cruises to offer their spare berths for shipboard training.

CTD Deployment training on board SoNoAT Training Cruise, 2019. Photo credit: L. Krug

POGO-SCOR Visiting Fellowship Programme

In partnership with the Scientific Committee on Oceanic Research (SCOR), POGO has developed a Visiting Fellowship programme on Oceanographic Observations which supports young professionals from developing countries to spend up to three months training in their speciality at a major oceanographic institution. This programme has been very successful in providing training, and has also helped to develop collaborations between institutes.

Training in Developing Countries

The NF-POGO Centre of Excellence Regional Training takes place in a different country every year, and is often hosted by an alumnus of the CofE itself. The 2-3 week long training courses have focused on specific topics delivered by experts in the fields, and have been held in Brazil, Vietnam, India, the Philippines, Mexico and Malaysia.

POGO also provides support for regional participation in training. Examples include the Austral Summer Institute (Chile), Masters in Applied Marine Science (South Africa), training at the Indian National Centre for Ocean Information Services, and the Masters in Physical Oceanography (Benin)

Training Initiatives by POGO Member Institutes

POGO co-sponsors training initiatives and provides grants for workshop attendance to enable scientists from developing countries to take part.

NANO Alumni Network

NANO (NF-POGO Alumni Network for Oceans) is a global network of former scholars of NF and POGO programmes on capacity development. The network is organised into regional coalitions such as NANO Africa, NANO Latin America, NANO India and NANO South-East Asia. Within the NANO network, NF and POGO promote joint research activities and training and provide a platform for networking and exchange.

NANO has been providing grants for regional research projects, global research projects and outreach activities to NANO members since 2012.

3 Outreach & Advocacy

POGO seeks to work with Governments, Foundations and Industry, to articulate the benefits to society and required funding to build and sustain the system.

One of POGO's goals is to inform the general public about the importance of ocean observations by providing examples of their many benefits for society. POGO also aims to inform policy through leadership of the "Oceans and Society: Blue Planet" initiative within the intergovernmental Group on Earth Observations (GEO), which operates at the Ministerial level.

OceanScape

Oceanscape.org is an effort of the GEO Blue Planet Initiative to identify the numerous organisations (including projects, programmes, and other structures) working in the "ocean space", and to clarify the connections between them (as well as identifying opportunities to make connections where none exist). POGO, a founding member of GEO Blue Planet, is leading the development of the Oceanscape portal. This portal, which launched during Ocean Obs'19 in September 2019, is a community effort that aims to serve a variety of stakeholders:

1. the scientific community, who may not be aware of all the initiatives taking place in the "ocean space", and who could benefit from identifying synergies, new collaborations, and avoiding overlap or duplication;

2. NGOs, as well as the private sector, who may be looking for suitable organisations for collaboration;

3. governments and funding agencies, who may not have a clear picture of the "oceanscape" of organisations, what they are each doing, and how they differ from one another.

Organisations enter their own profiles, and are requested to keep it updated in the years to come.

'Network View' of organisations in the Oceanscape portal

SoNoAT Schools Outreach

In June 2019, 23 early career marine scientists participated in the 'South-North Atlantic Training Transect' (SoNoAT 2019) Floating Summer School and spent four weeks on board the German Icebreaker, RV Polarstern, as she travelled from the Falkland Islands in the South Atlantic to Germany.

This shipboard training provided an excellent outreach opportunity to engage with school children in the UK, Germany, Ireland, Brazil and Japan, providing them with educational materials on ocean observations, including historical and live data for use in lessons, and the opportunity to ask questions of scientists on board the ship via Skype video calls.

Two schools also ran a 'Design a Cup' competition, with winning polystyrene cups being sent to the ocean floor, attached to CTD equipment. This demonstration of the effects of pressure in the deep ocean really captured the imagination of the children.

Where is Polarstern?

Shrunken cups returned from the deep. Photo credit: L Krug

SoNoAT instrument deployments plotted by Plymouth students. Photo credit: D. Parry

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