



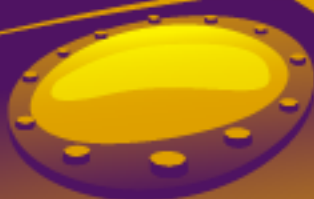
Ocean



Hackathon

PRESS KIT

www.ocean-hackathon.fr



2021 United Nations Decade
2030 of Ocean Science
for Sustainable Development

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Ocean Hackathon® is coordinated by the Campus mondial de la mer, which brings together the first French community dedicated to the knowledge and development of marine resources. The Campus is located at the tip of Brittany (France).

THE CONCEPT














Ocean Hackathon® is a non-stop, 48-hour event during which teams develop a prototype to tackle specific, sea-related challenges. This must be based on marine data made available by local, national and international providers. Ocean Hackathon® takes place in different locations at the same time.

Ocean Hackathon® is an initiative by Campus mondial de la mer which encourages sharing, the use of new digital technologies, and an entrepreneurial spirit. The concept originated in Brest in 2016, and was tested and optimised there before being extended to other towns and cities from 2019.

OCEAN HACKATHON® 8, A 5 STEP ORGANISATION

- 1** Call to host Ocean Hackathon® in your town or city
- 2** Call for challenges in your town or city, to identify the topics that will be the subject of a team, as well as their owner.
- 3** Registration to set up teams of participants
- 4** Ocean Hackathon® local event (17-19 Decembre 2023) in the 14 towns or cities
- 5** The International Grand finale (19 december 2023, in Brest and remote – 13 towns or cities participated)

AROUND THE WORLD

	City	Country	Number of challenges
	Brest	France	7
	Cherbourg	France	3
	Boulogne Sur Mer	France	11
	La Rochelle	France	6
	Toulon	France	7
	Plymouth	UK	4
	Bournemouth	UK	5
	Peniche	Portugal	10
	Kuala Lumpur	Malaysia	2
	Nord de la Réunion	France	8
	Nouméa	Nouvelle Calédonie	4
	Cape Town	South Africa	4
	Concepción	Chile	4
	Rimouski	Canada	4



In 2023, Ocean Hackathon® relied on its 9 Ambassadors, who contributed to the success of the national and international scale-up of the event. The Ambassadors rewarded the 3 winning teams of the International Grand Finale.





8TH EDITION



685+
PARTICIPANTS



14
TOWNS AND CITIES



76
CHALLENGES



600+
DATASETS



100+
DATA AND PROJECT
COACHES



19
GLOBAL DATA PARTNERS
AND MANY
LOCAL PROVIDERS

THE REACTION CORE: THE DATA

Research organisations and administrations collect large volumes of data to improve knowledge and support public policies. Ocean Hackathon® is an opportunity to explore the great potential of this data to address social, economic and environmental challenges. In order to enrich the prototypes and allow the teams to develop their challenges, the identification and provision of data for the challenges is carried out by the local organisation teams and by many global data partners. The data available during the weekend are both open and private data, from local to large scale. It can be in situ data, satellite data or data from oceanographic campaigns and numerical models.

THE GLOBAL DATA PROVIDERS IN 2023

Research and administrative organisations:

Cerema, French Office of Biodiversity, French Centre of expertise and data on nature (UMS PatriNat), Cedre, Ifremer, Marine environment information system (SIMM), Météo France, ODATIS Ocean Cluster, Shom, University of Le Havre, Indigeo

Innovation clusters:

Groupement Bretagne Télédetection, Pôle Mer Bretagne Atlantique

European and international organisations:

Copernicus Marine Service, DIAS WEkEO, EMODnet, Mercator Ocean International, Global Fishing Watch

THE TYPOLOGY OF DATA

Nautical and coastal charts; chart backgrounds; maritime and surveillance boundaries; aerial photos; coastline; toponymy; electronic navigational charts

Seabed (lidar and bathymetric surveys); sedimentological nature of the seabed; location of cables, pipes, wrecks, obstructions, buoys and floating markers

Tide prediction; water height; ocean forecasts; circulation; waves

Physico-chemical parameters (temperature, salinity, O₂, chlorophyll, etc.)

Biology and ecology; habitats (birds, marine mammals, fish, algae, etc.); ecological and biological state of environments

Microbiology; contaminants; water quality; macro-waste

Maritime activities; restricted areas

In order to facilitate data access for the teams, the metadata of the datasets selected by the Ocean Hackathon® data providers are mainly gathered in a Data Catalogue.

In 2023 it contained 600+ records. Part of the data is stored on Datarmor, a high-performance shared supercomputer for scientific computing and data management hosted by Ifremer.

In addition to data, global data partners also provide data processing tools and support to all teams. Data coaches mobilize their expertise in a wide range of marine and technical areas.





BOULOGNE-SUR-MER (FRANCE)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

Boulogne-sur-Mer is taking part in the Ocean Hackathon for the 4th time in a row, because this event not only highlights the needs of the maritime sector in the broadest sense (scientific, tourism, civic, fishing, etc.) and thus gets students and businesses interested in these issues, but also highlights the capacity for innovation. Last but not least, the Ocean Hackathon provides an opportunity to understand the needs and issues of the different regions taking part, and to see what solutions they come up with, making it a particularly inspiring event!



THE CHALLENGES

BOL01 - How can we get young people involved in ocean conservation through their school careers? by [IDEE](#)

Preserving the oceans is one of the most crucial environmental concerns of our time. It is therefore imperative to mobilise the younger generations in the fight for ocean conservation. One promising strategy for achieving this is to educate young people about the importance of the oceans. Introducing specific modules on the oceans into school curricula would enable students to acquire in-depth knowledge of marine ecosystems, the issues surrounding pollution, overfishing, habitat loss and climate change, and potential solutions.

BOL02 - Imagine a collaborative, technological tool for managing, raising awareness of and recovering plastic waste on the Opal Coast. by [CITC](#) and [Blue Living Lab](#)

The challenge will be to come up with an idea for a solution to clean up the beaches. You can include in this solution the technology of your choice (Artificial Intelligence, Internet of Things, etc.). The challenge will be completed by a fun and interactive gamification concept for the general public. But that's not all: this tool will also be a powerful way of raising community awareness of environmental issues.

BOL03 - What kind of fishing vessel will continue to feed us tomorrow? by [France Pêche Durable et Responsable](#)

Imagine the fishing vessel of tomorrow! A vessel that is carbon-free, incorporates virtuous approaches to the environment, improves working and living conditions and safety on board, respects animal welfare, etc. A vessel that guarantees the sustainability of the industry, enabling consumers to continue to eat wild and healthy seafood, limiting its impact on marine biodiversity and proudly supporting the industry and its regions. But it's a complex challenge, because it requires finding solutions adapted to the different sizes, types and techniques of fishing.

BOL05 - How can we make the coast a four-season tourist destination? by [Hauts-de-France Innovation Tourisme](#)

All over France, the coast is attracting more and more travellers, both local and from outside the region. But despite the boom in "local tourism" in recent years, the vast majority of tourist traffic is still concentrated in the summer months and during the main holiday periods, generating significant pressure on the environment and local populations. Our challenge will be to solve this complex equation: how can we boost the appeal of the Hauts-de-France's coastal destinations, while encouraging a more even spread of tourism throughout the year?

BOL06 - Creating an interactive digital tool to raise public awareness of microplastics.

by [ANSES](#) and [CMQ](#)

The response to the challenge must raise awareness and propose actions to reduce their use and dispersion by raising awareness in a fun and rewarding way among young and old alike. Reminder: In 2017, the United Nations declared that the ocean contained 51 trillion particles, 500 times more than the number of stars in the galaxy.

BOL07 - “Mers & Océans” to enhance the professional appeal of the conurbation.

by [Mareyage Boulonnais](#)

Despite its many assets, the Boulogne region is finding it hard to attract people. The recruitment difficulties experienced by companies in France’s leading fisheries hub bear witness to this...

Challenges: How can we get young technicians and managers (from France and abroad) to take an interest in the Boulogne area as a place to live and work? How do you encourage them to visit and then move? How can we support them practically in this process?

BOL08 - How can we ensure that recreational anglers in Hauts-de-France have up-to-date information on the regulations governing their activities?

by [Le Parlement de la Mer](#)

The provision of clear and accurate information on this subject is essential. To do this, we need to take into account :

the need to reach a wide audience, who may not have structures in place to relay information easily

the extent of the practice areas, which means that information cannot be systematically displayed

the specific geographical features of these regulations

the level of detail in the regulations

the diversity of the texts regulating this practice (ministerial decrees, prefectural decrees, European regulations)

the changing nature of these regulations (according to calendar periods, species, etc.) and finally, the opportunities offered by new technologies for disseminating information



THE WINNER

BOL09 - Creation of an application to take part in a collective global effort based on challenges and concrete actions in favour of the ocean

by [Nausicaà](#)

The aim of this application is to create a network of citizens, decision-makers, entrepreneurs, etc. who will share their solutions and concrete achievements in response to the various thematic challenges; Encourage users to undertake new actions around these different thematic challenges; Provide information on challenges in different geographical areas; Propose new collective challenges to be taken up; Putting in place a gamification mechanism that rewards commitment at different levels and provides the personal satisfaction of having completed an action and taken part in a collective action; Optimise the collective impact to be more effective.

At the end of the weekend, the AKOA team proposed an educational and participatory app that would put organisers of ocean-friendly events (conferences, waste collection, etc.) in touch with people who might be interested. The team presented a stripped-down beta of the application, as well as a presentation outlining its design and operation. Finally, the team presented its business model and strategy.





BOURNEMOUTH (UK)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

At Bournemouth University we are passionate about helping to protect and preserve a sustainable environment – and given our location on the south coast of England, the marine environment is especially important to us. We therefore saw hosting a local event for the Ocean Hackathon® as an excellent opportunity to bring together teams of our talented students, staff and local businesses to use their creativity and skill to develop solutions to global challenges. All the teams produced fantastic work, and we are planning to continue to collaborate with all of them on their prototypes and future projects.



THE CHALLENGES

BOR01: Marine plastics: Think global, act local

This challenge aimed to develop a mobile app for crowd sourcing of geo-tagged data on marine plastics, with the ambition of helping identify and ultimately reduce the amounts of plastic in and around our oceans. The team developed a prototype app called Ocean Citizen, which simultaneously used GIS and machine learning to identify plastics in situ, whilst also engaging and educating the public and wider stakeholders in the community.

BOR02: Monitoring coastal cliffs with AI and Internet of Things

Cliff failures represent a significant hazard in coastal environments, where rapid rates of shoreline retreat are threatening the economies, health and well-being of communities. This challenge team developed Cliff Guardian, a data-driven platform that aggregates heterogeneous data for monitoring coastal cliffs and assessing the risk of a landslide taking place. It consists of a REST API, a UI developed in REACT, and python ML libraries (SciKit Learn) and could be of interest to local communities, councils and emergency services.

BOR04: Determining effective interventions to reduce pharmaceutical discharge into the sea

This challenge team set out to create an innovative approach to identify the most efficient ways to reduce marine pharmaceutical pollution. Having consulted representatives from University Hospitals Dorset NHS Trust, they used a Bayesian Belief Network to work with large amounts of data from numerous sources to create evidence based predictions on the most effective management options. They developed a functioning, user-friendly prototype called PharmaSea Solutions to represent manageable disposal routes for different pharmaceuticals.

BOR05: Could wind and weed live in harmony?

With the benefits of growing seaweed becoming more apparent, this challenge team aimed to create an online tool to predict the benefits of colocation of wind and seaweed farms around UK waters. Having consulted with various stakeholders including The Crown Estate and a commercial windfarm developer, the team built a prototype using GIS and HTML to model and quantify potential outcomes based on factors such as distance offshore, job creation, marine capacity and CO2 sequestered per hectare.



BOR07 Marine Life Tech Explorer Challenge

Name of the challenge owner: Chris Courage

Identification and tracking of marine species helps in assessing and monitoring biodiversity, providing valuable data for climate change research. This team produced three interlinked prototypes:

1. A low cost camera, based on a raspberry pi framework which can store video and stream this when on the water surface
2. An AI fish detection system, called FishAI, to identify species in recorded images and
3. A participatory app called Finder, to identify fish to species level, linked to AI which will ultimately identify species of fish in real time.





BREST (FRANCE)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

Brest is a major port city and a hub for marine research and industry, with a wealth of expertise and resources in marine sciences and technologies. Hosting Ocean Hackathon in Brest brings together a diverse group of participants, including students, researchers, entrepreneurs, and industry professionals, to collaborate and develop innovative solutions for ocean-related challenges. It can also identify new projects which innovators in our region can support. Finally, we can promote the city as a hub for ocean innovation and contribute to the growth of the local ecosystem (Technopôle Brest-Iroise)



THE CHALLENGES

BRE01 : Plancktovision 2023: data visualization tool for plankton community imaging by Thibaut Pollina of Fairscope

We aim to develop an interactive web-based data visualisation tool during these 48 hours. This tool should be able to handle large plankton imaging datasets and represent them in a visually appealing and intuitive way.

BRE02 AI Time Serie Weather Forecast (ATISER) by Christophe Messenger of Météo France

Use of Standard Machine Learning to produce Time Series Weather forecast at sea point using buoy data archives as well as global analysis and forecast. The aim is to use regional numerical weather model forecast outputs to produce a very local weather forecast at a buoy location by running machine learning algorithm.

BRE04 Develop a tool to visualise physical ocean data collected by expedition sailing boats by Célestin Ballèvre d'[Astrolabe Expéditions](#)

Create an interactive map to display and make available to as many people as possible the data collected during Astrolabe Expedition's various expeditions.

BRE08 Reducing Ship-Whale Collisions by Romain Jan of [Greenov](#)

Make a map server to broadcast areas of high probability of cetacean presence. Ships will thus be able to adapt the route to avoid collisions with marine mammals.

BRE10 Collaborative platform for plastic knowledge and transitions by Baptiste de la Gournerie and Slimane Bendjilali of Utopia

The challenge of this hackathon is to design a draft of this ideal platform, imagining how it would work, the challenges it would face and the resources it would require. The platform must make it easier for users to find resources and offer an efficient contribution system. In practical terms, the platform will have to combine several essential components.

BRE11 Helping decision-makers in the event of aquatic pollution: integrating dispersion models by Noémie Fréalle

Refining decision support in the event of marine pollution, taking into account the dispersion of pollutants. Proof of concept of a model for the dispersion of a pollutant at sea based on the properties of the pollutant and data on currentology, meteorology and the sensitivity of the areas concerned.



BRE09 Rés'eau de Plala by Thibaud Idoux

In order to guarantee and improve the quality of bathing water, and to prevent environmental pollution in general, the aim of this project is to manage wastewater networks more effectively. Numerous sensors are present in the network's wastewater treatment plants and lift stations. They send data in real time and in very large quantities, which we are unable to analyze.

The Ocean Hackathon was a success on several levels:

- A policy for the management of sensors and attached data was drawn up to determine the most important sensors and their time step.
- A better understanding of overflow phenomena: data analysis, using data visualization tools, enabled a detailed understanding of the conditions generating overflows.
- Prediction of overflows: using machine learning tools, a model was developed to predict overflows at least 48 hours ahead.

In a context of major and costly network renewal, these achievements are an essential lever for saving and optimizing public investment.

Name of the challenge owner(s): Thibaud Idoux and his team : Pauline Joubert, Milann BEUZIT, Pauline Jannaire, Pierre HONORE, Olivier PONCELET and Vincent LE GRAND





CAPE TOWN (SOUTH AFRICA)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

The objectives of the Ocean Hackathon® are closely aligned with the objectives of our organisation. Driving the newest innovation and technologies to solve ocean-related challenges at a global scale is at the core of OceanHub Africa's work. Over the last few years as hosts of the South African chapter of the Ocean Hackathon®, we have had many exciting budding entrepreneurs and innovators who are dedicated to highlighting the blue economy join our local ecosystem (OceanHub Africa)



THE CHALLENGES

CAP01 - Citizen engagement and incentivized actions to protect marine ecosystems and combat pollution

Smart Pollution Reporting App: Create an easy-to-use smartphone/desktop app that allows locals to report pollution events near coasts. The software should allow users to record and document pollution using photographs, location data, and descriptions so that appropriate authorities can take action quickly.

CAP02 - Prediction of the sardine run and associated predator movement using image processing and environmental parameters

Sardine Movement Prediction Algorithm: Challenge participants to develop an advanced algorithm that utilizes historical migration data, environmental variables, and real-time observations to predict the timing, trajectory, and size of sardine shoals along the Eastern Cape coastline. This algorithm should consider factors such as water temperature, currents, wind patterns, and plankton distribution to provide accurate forecasts for the annual migration.

CAP03 - Re-wilding the Oceans - Kelp Farm Tycoon

Prototype of the kelp forest tycoon simulation game: develop a simulation game that focuses on rewilding the oceans by promoting the growth and sustainability of kelp forests. The game should educate players on the importance of kelp forests in our marine ecosystems and demonstrate how sustainable products can be derived from kelp. The ultimate goal is to inspire real-world action towards ocean conservation.

CAP04 - Can you Code Eyes for our Aerial Ocean Guardians?

Machine Learning model: detect, segment, and track boats in drone footage to help us combat illegal fishing and safeguard our marine ecosystems...



CAP02 - Prediction of the sardine run and associated predator movement using image processing and environmental parameters

The team developed a time series algorithm to predict the sardine run for tourists and communities. This is the first of its kind. They developed a web-based platform, working model and interface.

Challenge owner: Maryke Musson, Mark Addison, Nikhiel Singh

Organization: SAAMBR

Picture: Cape Town





CHERBOURG (FRANCE)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

Ocean Hackathon offered us a unique opportunity to bring together our local maritime experts, engineers, technicians, students, lecturers and researchers, to work, collaborate and innovate together for 48 hours non-stop (Excellence and innovation are at the heart of our Contentin brand “Terre Bleue Le Cotentin”).



THE CHALLENGES

CHE01 - Water quality and food webs / Qualité de l'eau et réseaux trophiques by France KIRCHSTETTER and Célia Féry

Scientific data is sometimes localized or incomplete. It may even be inaccessible or difficult to understand. Our ambition is to develop a web platform to disseminate the data collected in real time, and make it accessible to all. Specialized in monitoring the marine environment for various parameters, we can monitor water quality, for example. Clean water certification can be issued. To achieve an exemplary level of quality, mitigation solutions can be proposed.

CHE02 - Changes in beach elevation (Alti'plage) by Claire Marion

The Département de la Manche was a forerunner in observing the dynamics of its coastlines by installing an altimeter monitoring system based on markers. These markers have been installed on all three sides of the Manche coast since 1991, and are surveyed twice a year. This network of 156 markers is used to support the Alti'plage challenge, which aims to improve the recurrence of altimeter measurements over time, and to raise public awareness of the challenges of coastal dynamics in the context of climate change.

In particular, the team was able to propose a signposting system for these terminals (QR Code) to support a web interface from which the user can take a snapshot of the terminal. This snapshot will be processed automatically via a procedure that was tested at the Hackathon with satisfactory results, using Artificial Intelligence: object recognition, which then measures the distance between the top of the bollard and the bollard/sand interface. Thanks to geolocation, the interface offers the user direct feedback on this measurement, which can be viewed in the context of the beach's evolution, thanks to previous measurements, both citizen and scientific, making this database interactive.

Secondly, to encourage users to multiply their observations, an account and digital badge system has been set up to collect data from as many terminals as possible, grouped into 6 zones on the 3 facades. Each badge is then used to access other key viewpoints of heritage interest (nature reserves, local history...) and to unlock stories in the form of the serious Coastentin game. A system of rewards, such as discounts at partner structures, is also planned for the biggest contributors who become sentinels.



THE WINNER

CHE03 - Imaging at the Heart of the Marine Environment by Yann MEAR

The current rise in sea levels is one of the most worrying manifestations of global warming. Everywhere on the planet, sea levels have risen faster in the last 100 years than in the previous 6,000. So we need to be prepared for more erosion all over the world. As cliffs collapse, beaches, especially sandy ones, will continue to lose ground on a much larger scale. The depletion of sandy sediments is now the main cause of coastal instability and erosion.

The aim of our project is to provide the public with real-time images of the sediment bed in the coastal zone for monitoring purposes. To be useful, this information must be combined with information from databases (meteorological: wind; hydrodynamic: swell, tides) set up by government agencies.

Several complementary applications are envisaged, including:

1. A simple visualisation of the seabed for a fun approach open to all
2. Comparative analysis with environmental data for a better understanding of sand dynamics in the study area.

Throughout the development of the project, particular attention will be paid to reducing costs so that it can be used by as many people as possible.





CONCEPCION (CHILE)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

The French Chilean Institute and Inria Chile decided to organize Ocean Hackathon in Concepción, with the support of the University of Concepción and Data Observatory, because this event shows the relevance of Franco-Chilean cooperation. This event is an original initiative that reflects France's historic commitment to the protection of marine ecosystems through protection of marine ecosystems through scientific research and innovation. It is also essential to support efforts to tackle urgent challenges, which can be helped by research into digital technologies. We saw highly motivated teams, made up of bright young people working collaboratively to find solutions to a common challenge, preserving ocean ecosystems.



THE CHALLENGES

CON03 - Predicting Blooms: Overcoming Cloudiness in Chilean Patagonia

The project aims to create an algorithm that predicts the development of algal blooms in the Chiloé inland sea, and that is resistant to the loss of satellite data due to cloud cover in the area. Copernicus data, such as sea temperature, and climatic factors will be used along with scientific parameters to stimulate phytoplankton behavior and calculate the possibility of blooms in advance. The tool will benefit marine management authorities by enabling preventive measures and mitigating impacts on the ecosystem.

CON05 - Vamos a la playa

The project involves addressing the problem of beach degradation caused by human activity, which leads to the accumulation of waste and loss of biodiversity, generating eco-anxiety. The creator's idea is to produce a working prototype of the Vamos a la Playa application that includes information on the state of the beaches, citizen comments, education and an attractive user interface.

CON06 - LTCO (Let's take care of our oceans) : Waste edition

The project addresses one of the main problems affecting marine ecosystems, which is pollution by waste, especially plastics, which can be ingested by marine animals and cause them harm or even death. To address this concern and raise public awareness of this problem, LTCO (Let's Take Care of our Oceans) The Waste Edition, an ecological board game designed to address the life cycle of waste in relation to the oceans, from its production to its disposal, is presented.



THE WINNER

CON4 - License to krill: an IA biogeophysical model to manage krill ecosystems

The project is a machine learning model to predict krill volume in the Antarctic area to avoid targeted exploitation in the 48.1 sub-area.

The team was able to develop a prototype that allowed them to establish the abundance and geolocation of krill in the area of the elephant islands, obtaining results with a 15% error rate. The team was able to test 5 machine learning models and after comparing their results, they chose the best one. They also implemented a prototype of a web app that they hope to improve with the passing of time.

Name of the challenge owner : Cristian Cofré





KUALA LUMPUR (MALAYSIA)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

In 2022, the Embassy of France to Malaysia decided to organize Ocean Hackathon Kuala Lumpur as part of its ongoing effort to raise awareness on ocean conservation all while fostering innovation and multidisciplinary collaboration. Since it was a great success, the 2nd edition was launched in 2023, with the valuable support of the Lycee Francais de Kuala Lumpur. OH KL has strongly contributed towards bringing together multiple academic institutions and communities from contrasting backgrounds (ocean sciences vs. information, technology, computer sciences, etc.) that do not typically collaborate. In close collaboration with Ocean KAN, our aim is to build strong partnerships with local actors so that OH can become a recurrent/permanent event in Malaysia - and hopefully extend over to other countries in Southeast Asia.



THE CHALLENGES

KUL01 - Tracking Coral's Health and Spawning

Tropical coral reefs are the main habitat providing important ecological services to human being – and hard coral is a crucial component of these reefs. Unfortunately, coral reefs are threatened by numerous anthropogenic factors that cause significant environmental change and may increase the rate of coral reef degradation. It is therefore to better monitor their health status and to improve our knowledge and understanding of their reproductive processes. Currently, information about coral spawning in Malaysia (and South East Asia) is scarce and segmented, due to the fact that spawning events occur only in specific nights of the year, under very particular conditions (related to tidal cycle, sun and moon phases, seawater temperature and light intensity) and can be as short as few minutes. The developed app will allow for passionate members of the diving community to strongly contribute into collecting extremely valuable information and recordings, ultimately increasing the effectiveness of conservation efforts (especially in the case of endangered coral species) and of Marine Protected Areas (MPAs) management (e.g.: limit access to identified areas during spawning time to reduce human disturbances). Local communities and multiple stakeholders may also be involved in this initiative.

KUL02 - Digital Marine Fish Stocks : Distributed System for Monitoring Overfishing and Underfishing in Ocean

Overfishing in the ocean is a very specific problem depending on place and time, implying any overfishing and the loss of its marine biodiversity as well as threats to particular fish species. For example, the Chinese paddlefish became extinct due to overfishing. Overfishing in the ocean in the past has led to the decline of some fish species (fish-decreasing), which has had a negative impact on the marine ecosystem. Underfishing is critical to preserving marine biodiversity. We have studied that a real-time-based digital application is needed for monitoring fish-decreasing as well as overfishing and underfishing of marine fish which we feel is lacking. In order to protect the marine fish diversity and properly maintain the fish-based economy of coastal people, it is necessary to have real-time Fish-Stocks software through which Overfishing and Underfishing can be monitored at different times in different areas, which is currently a big challenge. Based on this challenge, we proposed the “Digital Marine Fish Stock” model where the data of fish caught by fishermen in different areas is stored in a central cloud server database by accessing software applications set in different areas, and a central monitoring team can monitor monthly or weekly overfishing and underfishing through the software. It is possible to get an immediate warning of overfishing for specific fish by setting the formula at the computer programming level of the proposed model.

KUL03 - Spatial and Temporal Visualization for Enhancing Climate Change Monitoring and Flood Management

This challenge is focused on building an interactive database as foundation for developing rainfall design characteristics for a water catchment as well as to study the rainfall runoff relationship using machine learning. Prevalence of flood has often been anecdotally associated to climate change due to the fragmentary hydrological data set and limited hydrological data analysis to validate the claim. To date, the rainfall runoff relationship in a water catchment is still not well understood for managing flood effectively due to the lack of coordination in establishing both rainfall and water level monitoring stations. The existing information system showing these data can be further enhanced in terms of legibility to better inform lay people especially those in the decision-making group. With the application of IOT systems to provide real-time monitoring, it is a matter of analyzing the data and providing spatial and temporal visualization to facilitate informed decision making and planning for developing urban drainage system to mitigate flood effectively. This challenge involves some basic temporal data analysis using existing data sets, and develop real time spatial visualization and indication of rainfall or high/low water level. Besides temporal data analysis, there is a need to analyze the characteristics of individual rainfall events such as intensity, duration and frequency which is essential for studying the rainfall pattern and its influence on the runoff at the water level monitoring stations.

KUL04 - SeaSleuths: Exploring Marine Biodiversity with Interactive Citizen Science

Malaysia is a vital hub for marine biodiversity, but most citizens remain unaware of its richness and the need for conservation. The South China Sea Repository and Reference Centre (RRC) holds over 50,000 aquatic specimens, yet its treasures remain hidden from the public. SeaSleuths emerges as a transformative force with a threefold vision. Firstly, it aims to make RRC's specimen data universally accessible through an interactive inventory or picture gallery search, enlightening the public about Malaysian marine life. Secondly, SeaSleuths presents species biodata through captivating infographics, shedding light on topics like invasive species, pollution, and climate change. Educational resources and real-time updates from research initiatives will foster an informed community dedicated to marine conservation. Thirdly, SeaSleuths creates an interactive citizen science platform where citizens actively contribute their sampling data and photographs. Expert verify species, and advanced AI aids species comparison, enhancing accuracy and efficiency. An interactive map allows users to explore species distribution in Malaysia and adjacent waters, deepening their understanding of the interconnected web of marine life. Gamification elements inspire engagement, rewarding participants with badges and achievements, fostering a passionate community committed to preserving Malaysian marine biodiversity. In summary, SeaSleuths unlocks Malaysia's marine diversity potential, inviting every citizen on a transformative journey towards ocean literacy, conservation, and ensuring future generations inherit a thriving and sustainable marine ecosystem.

KUL06 - Accessible Ecotourism backed with scientific evidence and policy

I would like to create an environment where the community or consumers have access to ethical practices in tourism. This means tourism operators that abide to best practice determined by scientific evidence are rewarded and promoted in a system that is globally accessible. Think of it like an Airbnb but curated for verified and approved ecotourism services (boat operators, snorkeling guides, diving shops, and hiking or trailing guides). Tourism operators may seek help from scientific community as well as inform the community on difficulties they face within their locality. Policy makers will be involved in providing support for the growth and sustainability of these operators based on community feedback and scientist recommendations.

KUL08 - A creative advertising billboard for raising public awareness and promoting donations

My challenge is establishing the software necessary to develop a creative digital street billboard to engage the donation, fostering the impact environmental crisis and promoting the field event. The content of the billboards will be updated monthly using ocean-related digital data on various topics. After establishing this billboard, I would like to develop collaborations with environmental NGOs in Malaysia, who could reach wider audiences by using this billboard to promote their field events (beach cleaning, mangrove planting workshops). Additional donation features will generate the necessary income to cover maintenance costs – any extra revenue could be donated to the partner NGOs. NGOs rely heavily on financial support from individuals, corporations, and even government grants to carry out activities such as conservation efforts, awareness campaigns, research, and advocacy. This project will contribute to help them pursue their vital work in protecting and preserving the environment in Malaysia.

KUL10 - Drone analysis of mangrove species and basic health condition

We invite participants to develop an innovative mobile application that utilizes drone footage to identify mangrove tree species and assess their basic health condition. Mangrove ecosystems play a crucial role in coastal protection, biodiversity conservation, and climate change mitigation. However, monitoring and understanding the health of these ecosystems can be challenging and time-consuming. The proposed DroneApp should leverage machine learning and computer vision algorithms to analyze drone-captured footage of mangrove areas and provide valuable insights. Key features of the application may include: Species Identification: Utilize image recognition techniques to identify different mangrove tree species accurately. Health Assessment: Develop algorithms to assess the basic health condition of identified mangrove trees, considering factors such as leaf color, density, and overall vitality. Data Visualization: Present the results in an intuitive and user-friendly interface, displaying identified species, health assessments, and any potential threats or anomalies detected. Geolocation Integration: Incorporate geolocation data to map the identified species and health assessments, providing a comprehensive view of mangrove ecosystems.

KUL11 - Capturing commercial crab landing, biodiversity, and conservation data in peninsular Malaysia via a citizen-based game model: Gotta Catch 'Em All!

Crab fishery is an important economic activity that supports the livelihood of coastal communities in Malaysia. There are several commercially important crab species that are highly sought after, both in the national and international markets, including mud crabs and blue swimming crabs. However, data on the types of species, their landings, sizes, and locations are almost non-existence, and this hampers the fishery management and conservation efforts of commercial crabs in peninsular Malaysia. As we believe in the inclusion of all levels of society into safeguarding our natural resources, and with the current technology readiness of all members of the society – from kids to older adults, the challenge will be to develop an interactive game that would allow users to report the findings of the edible crabs they bought or found in the wet markets, along with essential data that would contribute to the conservation and future fishery management of these valuable natural resources in Malaysian waters. The availability of these data can be used to estimate size at maturity, seasonal abundance, and ultimately inform policy for the establishment of fishery management measures such as the establishment of minimum landing size for commercial crab species in Malaysia.

KUL12 - What Changed in Malaysian Waters? Development of basic application programming interface (API) with Real time collection and representation of open-sourced remote sensing data.

Climate change has been threatening our livelihood and longevity of human civilization. Thus, the public should be aware of the empirical data and situation of climate change, so as to react and adapt to the situation. However, most data evidence of climate change in both governance and public awareness are hard to access or understand by the public. Furthermore, it takes large, long, and robust database to represent comprehensively the effects of climate change, due to its subtle and slow effect on us. Nevertheless, with the development of easy access, real-time collection, and open-sourced data on our environment, such data could never had been easier to access. With that said, such large data require a mammoth effort to organize, analyse and represent it in a publicly acceptable way. To date, such accessibility, both in publicly availability and understandability, is still lacking, which limits the awareness of climate change (especially the ocean) in our public. Especially in Malaysia, where we are in the centre of the biodiversity hotspot, Coral Triangle, which is threaten by climate change. Such effort to collate and disseminate the data is much needed. Hence, we require an effort to automate the collection of such real-time data in open-source platform regularly and represent it in the context of Malaysia to raise the awareness. The main objective of the project is to let the participants create a simple website which can help in educating the masses on climate change in developing countries (such as Malaysia). Temperature has been the dominant measurement of climate change. However, there are also a few indicator parameters which can be mined from satellite images. They are Sea Surface Temperature, Chlorophyll a, Salinity, rain cloud formation and more. The output of the challenge will see a development of common application programming interface (API) that can help in streamlining and optimizing the process. The participants will have to generate an API based on data from established database (i.e. GES DISC database), and turn to interactive application: annual, decadal average, annual difference, decadal difference), At the end of the session, participants will generate a simple interactive software, which can be used for public education and awareness program on climate change.



KUL09 iHAB: The Malaysian Marine HAB Initiative

Challenge proponent: Brenden Tan Poh Guan
E-mail: brendenguan@live.com
Student at Asia Pacific University (APU)

Team members:
Chun Hao Yong - Universiti Malaysia Terengganu
Jia Jyett Lee - Universiti Malaysia Sabah
Joeyanayasa Jona Dapanis - Universiti Malaysia Sabah
Trishah Rajendran - Asia Pacific University
Weng Hong Wong - Asia Pacific University
Ziwei Liu - Universiti Malaya

The Malaysian Marine HAB Initiative (iHAB) is a technology-based platform aimed at (1) allowing the prediction and live monitoring of harmful algal blooms (HABs), (2) encouraging citizen engagement towards HAB-safe waters, and (3) constituting a centralized data repository easily accessible by all stakeholders. The developed prototype includes sleek dashboards for visualizing data and risk prediction models. Thanks to an attractive educational and volunteering program, participants can get involved in the collection of citizen-science data and this contribute to enrich iHAB's repository. Target audience includes researchers, NGOs, government and private companies.





LA ROCHELLE (FRANCE)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

The Village by CA has been organizing the ocean hackathon in La Rochelle for 4 years. Last year, we organised it with Excelia and La Rochelle Technopole. This year, Excelia has taken the lead in this organisation, with the help of the Village by CA CMDS. It is a strong moment for the students where he is confronted with teamwork, problem solving very quickly, and entrepreneurial issues. The ocean and its preservation is an important issue in La Rochelle. It was therefore obvious for La Rochelle to organise the Ocean Hackathon again this year.



THE CHALLENGES

LAR01 - How can we recover textile waste washed up in the ocean and transform it into a new raw material?

Objective: To design an innovative and sustainable structure to recover and repair textile waste along the coast of Ghana, promoting the circular economy. The challenge will be to develop a project that aims to recover textile waste washed up on the coasts of Ghana in particular, and to transform or reuse it to create new products. This structure will have to be ecologically responsible and socially beneficial, involving the local community in the process.

LAR02 - Modelling the impact of a wind farm on local meteorology and consequently on bird populations

As part of the call for tenders for offshore wind farms No. 7, concerning an installation of wind turbines to generate electricity in the South Atlantic off the island of Oléron, we are looking at the link between offshore wind farms and the preservation of bird populations. Wind turbines, which are powered by the wind, have meteorological impacts on a local scale. The installation of a wind farm comprising several dozen turbines can create a site effect with meteorological disturbances. These meteorological disturbances represent a major change in the environment for local bird populations. In addition to the threats posed by rotating wind turbine blades, meteorological disturbances on the scale of wind farms can affect foraging trips, migration routes and the fitness of individuals, and can have an impact on the long-term survival of bird populations. Thus, measuring the aerodynamic trace of wind turbines using the technological tools at our disposal and using observations and remote sensing techniques to monitor the activities of avian populations of interest (sensitive species, umbrella, keystone, etc.) would make it possible to model the long-term impacts of installing a wind farm opposite the Ile d'Oléron. Estimates of the impact of wind farms on local meteorology can be made initially on existing wind farms in France, the North Sea and the Baltic Sea and the bird populations monitored interacting with these farms. Once these estimates have been made, a model of the impact of setting up a wind farm off the coast of Oléron can be produced. This model could be used to establish coherent conservation and compensation measures to ensure the long-term survival of the local bird populations affected.

LAR03 - DeSEAbel: Ocean Noise Pollution Reduction

Participants of the DeSEAbel Challenge challenge will focus on developing innovative solutions to reduce excessive underwater noise caused by human activities. The primary objective is to raise awareness about the detrimental effects of noise pollution on marine ecosystems and inspire effective strategies for its reduction. The challenge revolves around the development of practical and scalable initiatives that can be implemented to minimize noise pollution in the ocean.

Participants are encouraged to think creatively and propose solutions that encompass technological advancements, policy recommendations, and behavioral changes. The DeSEAbel Challenge offers a platform for collaboration and knowledge sharing among a diverse community of researchers, scientists, engineers and

commercials. Participants will have the opportunity to exchange ideas, leverage expertise, and contribute to the collective goal of restoring acoustic balance in our oceans. By participating in the DeSEAbel Challenge, you will be at the forefront of driving positive change for marine life and the health of our oceans. Together, let's work towards a quieter and more sustainable future for our seas.

LAR05 - Ostreiculture sector : What tools are available to help you self-assess your carbon impact?

The challenge could be broken down into 3 parts: (1) the oyster's CO2 capture potential, (2) the impact of the various farming techniques, including the instantaneous consumption and life cycle of the main consumables and equipment used, and (3) the CO2 capture potential of the various farming areas by their own ecosystem.

LAR07 - Using metrological data (weather and bathymetry) to create an interactive system dedicated to meteorological and marine hazards (storms, marine submersions, including tsunamis caused by gravity slides) and their estimated return periods

The BRGM tsunami inventory shows that this type of hazard is not uncommon on the metropolitan coasts, even though the seismic factor is rarely present. The study of events in La Rochelle Bay in 1785, 1875, and 1882 made it possible to locate underwater landslides within the Pertuis d'Antioche (Océan Hackathon 2020 - Annales de Bretagne et des Pays de l'Ouest, no. 127-4, 2020, Norois no. 263, 2022). The methodology used in the La Rochelle case could be applied to other unexplained tsunamis. Overall, the challenge aims to demonstrate that when meteorological or seismic factors cannot explain a submersion, it may be useful to use available hydrographic data. The objective is to compare pre- and post-event bathymetry to detect underwater landslides that cause unexplained tsunamis.



LAR06 - Creating a tool for capturing photographic data on the condition of equipment on ships and integrating it into a business application for maritime surveyors

Our application is developed and ready to be distributed to users. The control points are provided with photographs and educational sheets. Our challenges today are to implement a photographic AI on checkpoints to guide the user even more. Create maintenance alerts according to the recurrences recommended on the educational sheets.

Kevin started by presenting the project and then we went around the table to get to know each team member and their areas of expertise. We then split into two sub-teams: business management with Kévin and technical production with Gaëlle. The next day, we got together to think about our presentation material and then we divided the topics according to skills so that everyone (or almost) participated. And the result is there: the pooling of skills and the cohesion that we have managed to create have allowed us to win.

Name of the challenge owner: Kevin HENAF, from Eloyot





NOUMÉA (FRANCE)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

We've organized the Ocean Hackathon in New Caledonia for the third year running, because digital and maritime issues are very important to the territory. New Caledonia needs innovative ideas to meet the global challenge of preserving the oceans. A theme that makes perfect sense for our island.



THE CHALLENGES

NOU001 - MyTaxiBoat.nc

An application to enable lagoon users to reserve their place on taxiboats or for any other nautical activity. By gathering information on the number of people using the lagoon, it will help to regulate maritime traffic and make it more fluid.

NOU002 -Sea Stories

A "Pokémon Go"-style application to help people discover all the tales and legends associated with New Caledonia's marine world. Using augmented reality, the aim is to raise people's awareness of the history of the Caillou to better understand and therefore better protect the oceans.

NOU004 -The Caledonian PMTéiste guide

A collaborative application that allows users to list, share photos and comment on the various PMT spots, while also having access to identification sheets to help raise awareness.

NOU005- Lagoon events

A map listing all Caledonian events linked to the maritime world, with a description of the event. This interactive cartography will use artificial intelligence to locate each organized action.

NOU007 -SharkRadar

A mobile application with 2 components: a general public component, with predictive features that assess and display shark risk in real time. This component can also include educational information on shark lifestyles and proper behavior; A component aimed at beach surveillance teams, alerting them on the basis of AI trained to detect sharks from photos/videos taken by drone or cameras pointed at the bay.

Team NOU008 -Social Sea

A map informing users of their GPS position and unauthorized fishing zones. The app version will enable direct contact with maritime authorities to report malicious acts or any problem at sea. As the app works both ways, users will also be able to receive tsunami alert notifications.

Team NOU009 -Imagine 2025

A model of the August 19, 1943 naval battle in New Caledonia, pitting the Japanese submarine I-17 against American and New Zealand combined forces.



THE WINNER

NOU006 - Sea you later

3D modeling of the impacts of climate change on New Caledonia's coastal zones, to raise public awareness of the challenges of a changing world. The example was made on the Amédée island.

by Aline Schaffar (alschaffar@gmail.com)



NORD DE LA RÉUNION (FRANCE)



THE CHALLENGES

REU02 - Eolien off-shore, what do you think ?

The challenge is to create a tool for citizen cooperation and consultation that can help them visualize and understand everything that is at stake in this matter in order to facilitate decision making.

REU03 : Globice cetacean monitoring

To make cetacean observation data from Globice's sea trips and population monitoring easily accessible and attractive online. Systematically put online and optimise the display of the survey effort around the island and the observation data (data, images, sounds) collected by the various Globice teams.



THE WINNER

REU03 - Globice cetacean monitoring

To make cetacean observation data from Globice's sea trips and population monitoring easily accessible and attractive online. Systematically put online and optimise the display of the survey effort around the island and the observation data (data, images, sounds) collected by the various Globice teams.





TECHNOPÔLE
BREST - IROISE

Ocean Hackath

Novembre 17-19
2023

NOVEMBRE 17-19
2023



PENICHE (PORTUGAL)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

Portugal is a maritime country with a coastline of approximately 2500 km, boasting one of the world's largest Exclusive Economic Zones (EEZ), spanning 1.7 million km². This expansive area includes a wide variety of ecosystems and resources. The Portuguese maritime triangle (mainland, Madeira, and Azores) accounts for 48% of the total marine waters under the jurisdiction of the Member States of the European Union (EU) in areas adjacent to the European continent. Despite its vast potential, this resource is currently underexplored. The local HUB BLUE SMARTOCEAN, responsible for organizing the event, has emerged with the main goal of building an ecosystem where science, technology, innovation, and entrepreneurship come together to generate a sea of new ideas, solutions, and opportunities for a bright future. Therefore, the organization of Ocean Hackathon® in Peniche, Portugal makes complete sense, providing an excellent opportunity to reflect, analyze, discuss, and suggest blue data-based solutions that could be applied on marine sciences, ocean protection, pollution, climate, fishing, ecotourism, circular economy, and ocean safety and protection. Ocean Hackathon® will contribute to consolidate the marine innovation ecosystem that is being created in Peniche, a small coastal city with a long tradition on the exploitation of marine resources.

Ocean Hackathon® will also stimulate the emerging of a new generation of blue- entrepreneurs, that will develop and test disruptive ideas for a sustainable ocean (Sérgio Leandro and Celso Alves).



THE CHALLENGES

PEN01 - Peniche Ecotourism Cabin Design

Description: Help with creative designs for upcycling collected ocean waste into construction materials for sustainable eco cabins. Your challenge is to find innovative ways to transform things like old fishing nets, plastic debris, or other ocean trash into sustainable building materials for an eco-tourist project in Peniche. Deliverables could include example images or even real-life prototypes. Help give ocean trash a new life and show us your creative ideas.

PEN02 - Abnormal Vessel Behaviour Detection

Description: The challenge is the detection of abnormal behaviour of vessels using AI. By analyzing a database with vessel positions for a period of 2 years, deviations from the typical pattern should be detected. The usual movements of vessels, typical travel times and areas of operation should be characterized. Based on this information, deviations from the norm will be detected in order to detect anomalous behaviour.

PEN03 - Ocean's Datasources for AI

Description: How to Harness Ocean Datasources for Responsible Fishing: Empowering the Fishing Community In today's interconnected world, navigating the vast ocean of online data poses both opportunities and challenges for industries relying on ocean resources, like fishing. Responsible and efficient use of this data is crucial to their success.

Validating data in a user-friendly way is essential. By evaluating various sources, we ensure reliability and relevance, creating value for Ocean-related businesses. Bitliq is leading the exploration of datasources like Copernicus Marine Data Store, NOAA's Coastwatch, and Seabed 2030, aiming to develop a Smart Fishing Search algorithm for sustainable fishing. Reduced fuel consumption, CO₂ emissions, and cost savings are among the benefits. Incorporating additional vital datasources, like marine biology information, is vital to avoid destructive fishing practices. However, the main concern is using this knowledge responsibly. The integration

of Big Data and AI must be approached carefully to prevent misuse for profit-driven motives. Collaboration between tech companies and marine biologists is key. Together, they can create value propositions benefiting Ocean users and fostering responsible fishing practices. The goal is to guide fishermen wisely using information and digital tools, safeguarding marine resources. Proposing new business ideas is crucial to enhance sustainable fishing efforts. Identifying new targets or adding datasources and outputs can make a significant difference. By focusing on innovation and a strong ethical foundation, we empower the fishing industry to navigate the ocean of data responsibly. Challenge: Generate business ideas around this subject, identifying new targets, datasources, or outputs to promote sustainable fishing.



PEN04 : Galene, an AI-powered model to guide nature-based solutions to climate change

Description: Using the environmental data provided by the Copernicus Marine Service, we'll develop a ML algorithm to predict how the range of critical coastal ecosystems, such as seagrass, mangroves, and coral reefs, will shift under the present climate change scenario. Key environmental variables will be considered in the model (temperature, pH, salinity, ...) and selected accordingly to the species' ecological niche. The model's outcome will help direct conservation and restoration efforts, simultaneously providing a tool to improve marine spatial planning. The ultimate goal is to maximise ecosystem and biodiversity protection and, therefore, ensure the continuity of ecosystem services. Ecosystem services, including carbon sequestration, food security and coastal protection, are critical for coastal and non-costal communities and represent a fundamental solution against climate change (a Nature-Based Solution, as per the definition of WWF). The idea places itself at the intersection between data processing and marine conservation. We want to approach the now long-standing threats to coastal ecosystems with technology, mature enough to effectively process the large data provided by satellites. In the future, we would like to create a network of partnerships with stakeholders to advance informed decision-making in marine conservation and, through data-sharing, fine-tune our model for local, specialised results. For this hackathon, we are going to focus on Portuguese coastal ecosystems. Among the potential sites, there are the Tagus Estuary Nature Reserve, the Professor Luiz Saldanha Marine Park and the Berlengas Nature Reserve. The Estuary Nature Reserve and the Saldanha Marine Parks include two critical ecosystems for carbon sequestration, wetland and seagrass, respectively, that will play a fundamental role in climate change mitigation. On the other hand, being placed at the top of the Nazarè Canyon, Berlegnas waters are rich in nutrients thanks to upwelling, whose intensity is influenced by climate change.

Name of the challenge owner: Alessandra Sellini, from Galene





PLYMOUTH (UK)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

Home to stunning natural harbours, the largest naval base in Europe, and the UK's first National Marine Park, Plymouth is a natural fit for the Ocean Hackathon. A global centre of excellence in Marine, Plymouth is one of the largest clusters of expertise in Europe and an ideal test-bed for innovation and entrepreneurship. Hosting this event has enabled the organising team to strengthen links between partners, stakeholders and the community, helped us understand how we can unlock the immense potential and value of our data, and served as an exciting and vivid demonstration of the power of collaboration! (Rupert Lorraine, Director of the Arts Institute, University of Plymouth)



THE CHALLENGES

PLY01 : SEA-ing Differently

A collaborative research project between UoP and Riverside Community Primary School. Child friendly interactive app to connect children and families to the sea and ocean. Providing parents with the knowledge to answer curious children's quizzical questions.

PLY02: Planktamonium

Educational tool and strategy card game to educate and inspire the next generation of plankton scientists.

PLY03: From Sargassum seaweed to sustainable ship building

Sargassum, an invasive seaweed species, has a seasonal presence in Plymouth Sound National Marine Park and predictions suggest it will further impact the UK by 2050. It poses ecological risks and navigational hazards - but the time has come to turn this threat into an opportunity.

The challenge is to develop a prototype process for the sustainable removal of Sargassum seaweed from Plymouth Sound and its conversion into bioplastic materials suitable for boat building.



PLY04 - Coast Track

Shoreline change information is a critical part of the data collected by the Wales Coastal Monitoring Centre. Traditional methods of beach data collection involve the use of expensive survey equipment and trained personnel. These surveys typically occur twice a year.

CoastTRACK is an erosion risk forecasting and response tool. Using images submitted by the public to quantify and forecast erosion risk and recovery of sand levels along the coastline.

Name of the challenge owner: William Russel, Wales Coastal Monitoring Centre





RIMOUSKI (CANADA)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

Rimouski is often labeled as Quebec's maritime capital. As such, we believed that Rimouski was the ideal location to host an Ocean Hackathon since the city is at the core of ocean innovation in Quebec. Rimouski brings together an outstanding community of students, researchers, companies, applied research centers and accelerators.

Gathering all the participants allowed for the hackathon to be a real success in which we had the privilege of witnessing the collaboration between the participants. We hope that the teams will continue to work on their prototype and maybe launch companies.



THE CHALLENGES

RIM01 - Understanding sound dynamics in industrial and urban environments

The Port of Quebec has sound sensors on its territory and in the community. A number of studies are currently underway on this database to gain a better understanding of the source and type of noise and to try to predict it. Data on the presence of ships, winds and weather conditions is also available.

RIM02 - TraSEAbility - From the sea to the plate

Digitize traceability in the aquatic products supply chain in 48 hours. The idea is to set up a pilot system for exchanging traceability data. The aim is to create a digital platform.

RIM03 - Groundfish high-tech trawl net

A design of complete fishing gear, with all mechanical and electronic systems, suitable for redfish fishing in the Gulf of St. Lawrence. If you can also limit the impact of the gear on the bottom, even better! The fishing gear must be able to recognize each fish entering the trawl. Only fish of the right species (redfish in our case) will be caught in the codend. The others must be redirected (alive!) out of the trawl via an escapement device.

RIM04 - Predict the potential danger to marine mammals caused by ghost fishing gear in the St. Lawrence river

- Develop a method to predict the quantities of fishing gear that will be lost per zone.
- Develop an online interactive tool to visualize the various data available on the CIDCO's QGIS server (such as prioritization tools and marine mammal observation zones) along with the predictions made in the previous point.



RIM04 - Predict the potential danger to marine mammals caused by ghost fishing gear in the St. Lawrence river

- Develop a method to predict the quantities of fishing gear that will be lost per zone.
- Develop an online interactive tool to visualize the various data available on the CIDCO's QGIS server (such as prioritization tools and marine mammal observation zones) along with the predictions made in the previous point.

Prototype developed: Interactive map, displaying 2.75km x 2.75km zones with a prioritization score. Display of observation zones for different marine species (individually or in groups). Bathymetry available for the entire Gulf of St. Lawrence. As the zones in the prototype prior to the challenge were based on a plan, the area of the recovery zones diminished as you moved northwards. The zones were all redesigned to correct this problem. To ensure accessibility, the tool was deployed on the web with a domain name: www.missionpechefantome.ca

Name of the challenge Owner: Dominic Gonthier, from CIDCO





TOULON (FRANCE)



WHY DID YOU DECIDED TO ORGANIZE OCEAN HACKATHON® IN YOUR CITY AND WHAT IT HAS BROUGHT YOU?

TVT Innovation has chosen to organize the Ocean Hackathon to highlight the permeability of our ecosystem and maintain the attractiveness of the region's maritime and environmentally-friendly environment. The Ocean Hackathon enables Toulon to raise the profile of the Mediterranean basin on the international stage, and allows Mediterranean projects to benefit from ocean data.

On the other hand, our desire to highlight innovation and open innovation is part of a broader approach aimed at inspiring and mobilizing young people. By sharing methods with them and offering them an experience similar to that of the working world, we hope to stimulate their creativity and passion for innovative solutions. The Ocean Hackathon thus represents a unique opportunity for students to contribute to concrete initiatives while developing their skills and fostering a collaborative culture within our community. These 48 hours of creativity bring together large groups, often not very accessible, students and entrepreneurs (Mandy Marringhis Scalas).



THE CHALLENGES

TOU02 - What the fish

To preserve marine biodiversity, using gamification to raise public awareness.

TOU03 - Modeling the ECOACT method

AI modeling / API calls for cutting documents and sustainable methodologies. ECOACT case study to protect Posidonia meadows.

TOU04 - Monitoring of pollution at sea by management authorities

Identify pollution or risk situations at sea in real time, and assist an operator in characterizing the event, using conversational artificial intelligence technologies.

TOU05 - Drones autonomes

Develop software with an AI engine to improve the navigation (species recognition, obstacle avoidance) of an autonomous surface marine drone.

TOU06 - Meet them all ! Ceresia

Design a mobile application to identify and recognize endemic species or corals.

TOU07 - Modeling volume of boats around the Var

Determine the impact of human activities at sea, in order to better protect the environment by quantifying ships and motorboats, modeling their acoustic behavior and correlating it with existing marine data, and identifying areas of high noise pollution to protect them.



TOU01 - Vanessa - Autonomous Radio Message Recognizer and Responder Simplifying marine communication with VANESSA, a new marine tool.

The aim is to create a mobile application using VANESSA, which will enable radio messages to be deciphered and transcribed on boats. AI for analyzing voice flows.

Name of the challenge owner : Edouard Vallet, Vaiata Dynamics



THE INTERNATIONAL GRAND FINALE

On 19 December 2023, the Ocean Hackathon® International Grand Finale 2023 took place, organised by the Campus mondial de la mer. 13 winning teams of the local November editions pitched the results of the 48-hour non-stop hackathon. 12 finalists were in Brest for the occasion and 1 participated remotely. Each team had 6 minutes to present its project and 5 minutes to answer the jury's questions and convince them. As well as being an international pitch competition, the Ocean Hackathon® Grand Finale is also, and above all, a high point, mixing languages and cultures and resolutely focused on preserving the ocean.

The Jury

The jury consisted of representatives of the Ambassadors and the organisers of the local editions (the latter could not vote for their own team). The criteria: clarity of presentation, expression of the problem to be solved, dynamism and originality of the pitch, adherence to time limits and involvement of all team members in the project.

Representatives of the local organisers:

- Alastair Morrison (Bournemouth)
- Françoise Duprat (Brest)
- Samaneh Rajaeidoust (Cherbourg)
- Valérie Barbosa (Kuala Lumpur)
- Mathieu Godard (La Rochelle)
- Sergio Leandro (Peniche)
- Lorraine Rupert (Plymouth)
- Iliass Lamrini (Rimouski)
- Florence Sergent (Boulogne-sur-mer)
- Herland Cerveaux (Cape Town)
- Nayat Sanchez Pi (Concepción)
- Chalotte Blottière (Toulon)

Representatives of the Ambassadors and partners:

- Michel Cousquer (Cerema)
- Pierre Serodes (Ifremer)
- Céline Liret (Océanopolis)
- Jean-Claude Le Gac (Shom)
- Alexandre Luczkiewicz (Cluster Maritime Français)
- Fabrice Messal (Mercator Ocean International)
- Minh Tâm Hua (Secrétariat d'Etat chargé de la mer)
- Krishna Chaitanya Rao Kathala (University of Massachusetts Amherst)
- Linwood Pendleton (OceanKAN)

The Keynote about the ARGO programme

During the much-awaited calculation of points, participants had the chance to attend the keynote address **“The history of ARGO data: from the sensor to your smartphone”**, by **Guillaume Mazé** (research oceanographer-physicist, Ifremer) and **Kevin Balem** (development and data processing engineer, Ifremer).

ARGO is an international programme for collecting oceanographic data (temperature, salinity and biogeochemical parameters) in real time from 4,000 autonomous profiling floats that drift with ocean currents and regularly dive below the ocean surface. Ifremer has been a major player in the ARGO programme since its inception.



THE WINNERS 2023



1st place: Toulon (France)

Title: Vanessa

Topic: Simplifying marine communication with VANESSA, a new marine tool



2nd place: Concepción (Chile)

Title: License to krill

Topic: an IA biogeophysical model to manage krill ecosystems



3rd place: Kuala Lumpur (Malaysia)

Title: iHAB (Advancing Management of Harmful Algal Blooms)

Topic: A High-Performance Predictive Tool for Enhanced Prevention and Mitigation



Ocean Hackathon® is one of the actions coordinated by the Campus mondial de la mer, driven by Technopôle Brest-Iroise and funded by Brest métropole and the Brittany Region. OceanHackathon® is also supported by its Ambassadors and rely on the local advisers, which organise the event in their city, transdisciplinary teams for the co-design of ocean science and knowledge

Ocean Hackathon® is organised by:

with the support of:

