

Actors of the sea,
digital and innovation,
organise
Ocean Hackathon®
in your city



CAMPUS
MONDIAL
DE LA **MER**



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2021
2030 United Nations Decade
of Ocean Science
for Sustainable Development



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	Country	City	Number of challenges
	Abidjan	Ivory Coast	4
	Brest	France	9
	Boulogne-sur-mer	France	9
	Cape Town	South Africa	4
	Klaipeda	Lithuania	3
	Kuala Lumpur	Malaysia	9
	La Rochelle	France	6
	Mexico	Mexico	5
	Nouméa	New Caledonia, France	7
	Santiago	Chile	4
	Sausalito	USA	5
	Toulon	France	7
8		12	72

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® 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. At the tip of Brittany (France), the Campus is based on the dynamics of Brest, Roscoff, Morlaix, Quimper and Concarneau.

In 2022, Ocean Hackathon® relied on its 10 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.



OCEAN HACKATHON® 6, 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 events
(2-4 December 2022) in the 12 town or city

5

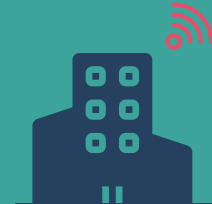
The International Grand Finale
(9 February 2023, in Brest and remote)





675+

PARTICIPANTS

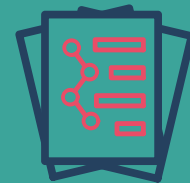


12 TOWNS
AND CITIES



72

CHALLENGES



600+

DATASETS



100+

DATA AND
PROJECT
COACHES



19 GLOBAL DATA
PARTNERS
AND MANY LOCAL
DATA PROVIDERS

THE REACTOR 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 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

THE GLOBAL DATA PROVIDERS IN 2022:

- Company: SenX
- 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
- Innovation clusters: Groupement Bretagne Télédétection, Pôle Mer Bretagne Atlantique
- European and international organisations: Copernicus Marine Service, DIAS WEkEO, EMODnet, Mercator Ocean International, Blue-Cloud

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 2022 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.



CHALLENGES IN ABIDJAN

Detecting plastic waste in waterways (ABJ01)

Powering an Artificial Intelligence (AI) to manage litter in streams. Predict, anticipate, prevent and/or eliminate litter in streams using a large image dataset.

By: Regional Center of collaboration (CRC)

System of identification and preservation of fishing areas with evaluation of fishing frequencies allowing the sustainable preservation of fish species (ABJ03)

By: Ministère des Ressources Animales et Halieutiques de Côte d'Ivoire (MIRAH)

Mapping of areas potentially suitable for marine aquaculture (ABJ04)

By: CONSOI Consulting



THE WINNING TEAM FROM ABIDJAN

CARTOMA - INTELLIGENT MANGROVE FOREST DETECTION SYSTEM BASED ON SATELLITE IMAGERY AND RECONNAISSANCE DATA FOR IDENTIFICATION AND MONITORING OF MANGROVE HEALTH (ABJ02)

DFTP (Défends Ta Patrie) is a startup that aims to popularize the exploitation of satellite imagery, artificial intelligence and the use of drones to facilitate the management of critical natural resources by providing Africa and the world with innovative solutions in the blue ecosystem sector.

“Our solutions offer reliability, performance and accuracy. We have designed a CARTOMA solution based on artificial intelligence to map, monitor and facilitate the restoration of mangroves”, explains the owner of the project.

By: West African development bank (BOAD)



© BOAD

CHALLENGES IN MEXICO



The North America oceans and sustainability (MEX02)

Reduce the Carbon Footprint and raise awareness regarding Oceans in Mexico Country, through an information system.

By: Guillermo Corona Puente

A wave of changes (MEX04)

Coastal areas have been under constant pressure and growth in recent years. This project aims to create an interactive map of common tourist sites (beaches) where it is possible to observe their deterioration over time, this can be achieved by comparing satellite images and photographs loaded on maps. It also seeks to add the description of species that inhabit the area and the ecosystem services it provides. Finally, I would seek to include actions that as citizens we can carry out for its conservation and protection.

By: Marcela Santana Guzmán

THE WINNING TEAM FROM MEXICO

PROTECTION AND CONSERVATION OF HISTORIC SHIPWRECKS IN MEXICO'S ALACRANES REEF (MEX03)

Development of a video game to raise awareness, strengthen and inform the public about the problems faced by the conservation of underwater heritage in a scenario of climate change, increased economic activities such as fishing and tourism.

By: Maria Sabrina Ruiz Freeman

Tracking Mexican fishing activity through VMS data (MEX05)

An interactive geographic information system applied to fisheries. Under the United Nations International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported, and Unregulated Fishing (IPOA-IUU), member countries agreed to introduce legislation requiring large vessels to include a satellite tracking system. The Vessel Monitoring Systems (VMS) are used primarily to enforce fisheries policies and operations. But it can help understand the behavior of the spatial and temporal distribution of fishing activity and intensity providing information on large spatial scales.

By: Causa Natura A.C.

Affirm life for the construction of a new planetary project (MEX06)

Creation of a web page to raise awareness about the effects of global warming on the oceans and to prove that a sustainable food system is a great alternative to stop the damage to the planet.

The first contribution is to change our eating habits. We must promote the consumption of fish because it is a very high-quality protein; but it is very important to control fishing levels to avoid overexploitation.

Another great advantage is that there are wild fish that are cheaper than chicken, pork or beef.

By: Karla Evelia Chacon Mosqueda



© Adviser from Mexico

WHY DID YOU ORGANISE OCEAN HACKATHON® IN BOULOGNE-SUR-MER?



For the 3rd consecutive year, Boulogne-sur-Mer has participated in Ocean Hackathon® initiated by the Technopôle Brest-Iroise/ Campus mondial de la mer. For 7 years now, Boulogne-sur-Mer has been organizing an annual ideation event dedicated to blue innovation: the Sea & Coastal Innovation Festival (FIML). Integrating

a Hackathon to this event was necessary, and the Ocean Hackathon®, by its philosophy, its international and innovative dimension seduced Boulogne-sur-Mer and thus naturally found its place within the FIML. The Ocean Hackathon® has been for 3 years now a very expected highlight of the FIML.

CHALLENGES IN BOULOGNE-SUR-MER

The regional brand for aquatic products, a solution to perpetuate the industry (BOU01)

The Aqua Ethique created a regional brand for aquatic products that adds value to the products through ethical work: investment of part of the brand's revenues in aquaculture projects to control production and preserve the natural resource, highlighting of seasonal products, transfer of part of the profits to ocean preservation associations.

By: [Haut-de-France Region](#)

Digital stormwater plastics awareness tool (BOU02)

The Ava Connect' team developed a connected storm drain that recovers waste washed away by rainwater. It is connected to a terminal installed nearby which gives real-time information on what it contains, and global information on the impact of plastics on health, the ocean, etc. This connected gully is a way to recover waste before it is thrown back into the sea, and also to identify pollution



© Kévin Gillon

hotspots in cities to act upstream by identifying the reason of these hotspots.

By: [Institut des sciences de la mer et du littoral \(ISML\)](#)

Development of the military and coastal heritage between Ambleteuse and Le Portel: a challenge for a landscaped tourist route of historical and geographical discovery (BOU03)

The SPOT team developed an application to enhance the military and coastal heritage of the Opal Coast. The user is geolocated, he is informed about the different hiking trails around him and has access to information related to these trails: the level of difficulty of the trail, its length, as well as the different places of interest related to the military and coastal heritage. When the user passes near one of these places, he receives a notification thanks to the geolocation indicating that he is near a spot and giving him information about it: photos, history, important facts, as well as a visual that shows the user how the spot was when it was just built.

By: [Institut de recherche et enseignement en tourisme \(INRENT\)](#)

Tourist Office: What about our brochures tomorrow? (BOU04)

The Listembourg Eagle's team developed a dematerialization of tourist brochures via the optimization of the Tourist Office website to make it 100% responsive, tablets that broadcast tourist information at strategic locations, and finally, putting a QR code on flyers so that people who do not need a paper version use the QR code and leave the flyer to people who are not comfortable with the digital tool.

By: [Tourist Office of Boulogne-sur-mer](#)

Waste tracker Opal Coast (BOU05)

The Wav-E team developed a circular economy system via connected containers with waste sorting, which reward with vouchers at local merchants each citizen who deposits waste there. The waste collected by these containers is then sold as raw material. The emptying of the bins is ensured through professional insertion.

By: Jimmy Ledrin

Monitoring reef conservation and restoration thanks to data (BOU07)

The Ekokoraï team developed a participatory tool to identify geographical areas where coral is damaged, and which allows users to consult and/or update various data on the subject (photos, water temperature readings, water quality, etc).

By: Koraï

How to optimize interport synergies: management of incoming/outgoing flows)? (BOU08)

The ESEA'O team developed a tool for port managers to create synergies between ports and optimize the use of traffic.

By: Hauts-de-France Region

A solution for STEM and ocean education (Science, Technology, Engineering, Math) (BOU09)

The COD IA team proposed the creation of educational kits in French, aimed at pre-teens and teenagers, for the initiation to computer programming.

By: Coding & Bricks

THE WINNING TEAM FROM BOULOGNE - SUR - MER

FISH FARM SIMULATOR (BOU10)

The Fish Farm Simulator team developed a simulator of management of an aquaculture farm with two levels: In the first level worked as an «educational serious game», the user of the simulator will start with a small farm and will have to make it grow, to manage the exports, etc. This level will allow the user to become familiar with the semantics of the trade, to understand the operation of an aquaculture unit, etc. In the second level, intended for professionals, the user will have to create his aquaculture farm by entering the different parameters he envisages: the number of employees, the species to be raised, the water parameters, the purchase of materials, etc. The simulator will create the aquaculture farm with the requested parameters and will simulate different results depending on these parameters. Thus, the user will know the power consumption, the cost of the human resource, the yield, etc. Also, he will be able to see different scenarios: for example, if the number of working hours to be carried out for the proper functioning is distributed among too few employees, the risk of errors due to fatigue increases.

By: CMQ AVCPA



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WHY DID YOU ORGANISE OCEAN HACKATHON® IN BREST?



Ocean Hackathon® is organised in Brest since 2016 by Technopôle Brest-Iroise, a business support non-profit organization. In 2022, the local event were welcomed by the engineering school ISEN-YNCREA Brest 100% in presential. 9 various projects and 65 participants from different expertise. The youngest participant was 18 years old, the oldest was born in 1946. Ocean Hackathon® is a bridge between generations, between students and experts. Computer science and coding, geomatics, marketing, economics, political science, marine science, etc.: the richness of the skills present and a good distribution of roles once again led the teams towards innovative solutions.

CHALLENGES IN BREST

SAMi (BRE01)

A case for sampling and measuring water pollution (hydrocarbons, chemical pollutants). This tool can be used by a novice or experienced operator. An associated computer terminal provides information on the sampling environment (geolocation, weather, etc.), guides the operator and rapidly transmits the information to the marine pollution alert services.

By: [IMT Mines Ales](#) and [Cedre](#)

SSM (Sea Sergeant Major) (BRE02)

An algorithm for detecting anomalous AIS (Automatic Identification System) data. Analysis of the consistency and integrity of AIS data is a means of combating, for example, cyber attacks or illegal activities at sea. AIS currently ensures the safety and security of more than 400,000 ships worldwide.

By: [CEREMA](#)



© Technopôle Brest-Iroise

Minimising collisions between cetaceans and ships on the French Atlantic coast (BRE03)

A map to identify areas of high probability of cetacean presence. This will allow ships to adapt their route to avoid collisions with marine mammals.

By: [CEREMA](#) and [Greenov](#)

"Mer et Bout'ficelle" (BRE04)

The «C'est pas sorcier» (French TV programme for the popularization of science) of the sea».

A platform of educational resources for schoolchildren, college students and high school students.

This educational tool can be used by teachers or sailing school instructors.

By: Vincent Verbeque

Data Art Ocean (BRE06)

A sound and visual art experience created from scientific data on the ocean.

By: Loïc Druesne

GO2DAT - Generating and Exploring Ideas for Developing a Global Ocean Oxygen Database and Atlas (BRE08)

A world atlas of oxygen in the oceans in a website.

The objective is to visualise on a map the levels of this molecule, which is fundamental to the life of marine ecosystems.

The challenge is part of the international GOOD project endorsed by UNESCO as part of the Decade of the Oceans.

By: [OceanOPS](#)

Sillage Carbone (BRE10)

The Yuka of products transiting by ship (90% of international trade). Scanning a product to find out its carbon footprint. A way to raise awareness among consumers of products that have travelled around the world.

By: Julian Le Deunf

Dive and collect (BRE11)

A web platform model to make recreational diving more responsible. A good way to raise awareness about the protection of underwater biodiversity.

By: Sophyline Phay

THE WINNING TEAM FROM BREST

SEASCAPE GAME: THINK OF YOUR STRATEGY! (BRE07)

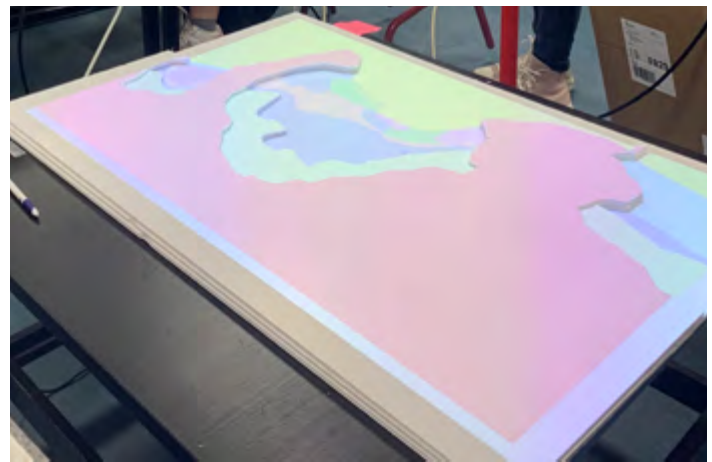
Consultation game on the problems of erosion and marine submersion.

Local elected officials, associations and residents of coastal municipalities can be made aware of coastal risks in a fun way.

On the technology used side, the team had a well-stocked toolbox: geographic information systems, NFC chips (to exchange information between two devices), infrared detection, image recognition, microcontrollers and videomapping.

The team was composed of experts in aquatic and coastal risk management, geomatics, public policy, programming, 3D development and virtual reality, marketing and art.

By: the non profit organisation S.M.Aug



© Technopôle Brest-Iroise



The Seascape game team © Technopôle Brest-Iroise

WHY DID YOU ORGANISE OCEAN HACKATHON® IN CAPE TOWN?



This is the second year we organized the Cape Town Edition of the Ocean Hackathon® and we did so as the Ocean Hackathon event is perfectly aligned with the core values and mission of our company – developing innovative solutions to challenges with a direct positive impact and focus on our ocean.

We decided to host the Ocean Hackathon® Cape Town again

as we think it is so important to highlight how ocean data can aid in developing innovative ocean-impact solutions as well as gathering young data science, IT development, business administration and marine science talents to develop these solutions.

For us the event allowed us to interact with new people who work within the space of collecting data, our jury members and our data coaches as well as sharing our passion for the ocean with these individuals. We enjoyed being able to be a part of this international event and how it showcases the power of teamwork and people coming together, from all different fields, working towards the same goal to protect our ocean.

CHALLENGES IN CAPE TOWN

LOST (Lagrangian Ocean Search Targets) (CAP02)

The purpose of the Lagrangian Ocean Search Targets (LOST) application is to provide more accurate decision support for rescuers looking for persons or objects lost at sea. It uses the Lagrangian ocean analysis framework which has been adapted to provide real-time estimates of the positions of objects based on operational ocean and wind forecasts.

LOST incorporates the impact of ocean currents, surface winds and stochastic motion, the latter being critical in accounting for sub-grid scale processes that are not resolved in the ocean and wind forecasts. The objective was to build an interactive data application framework for LOST, enabling users to easily run LOST simulation, visualize the output and retrieve analytics via an API and front-end, to support their operations at sea.

By: [Consortium: Deltares, DGF-I-TUM and SMIT Salvage](#)



© OceanHub Africa

MPAs alert system (CAP03)

Marine Protected Areas (MPAs) are areas which not only protect marine ecosystems, but also provide economic, environmental and social benefits to people.

Despite the existence of these protected areas along coastlines, (Illegal, Unregulated and Unreported) IUU fishing still occurs, however, there is a missing link between MPAs management and small-scale fishing communities, including compliance to regulations, effective monitoring, the promotion of sustainable fishing practices and lack of access to knowledge about MPAs. With 42 MPAs protecting SA's ocean, there is a need to ensure the successful coexistence of Small-Scale fishermen (SSF) and MPAs in SA.

Through an alert system demarcating and identifying no-fishing zones and subsequently informing small fishermen vessels when they are in the vicinity, we can strive to secure symbiosis between MPAs and SSF.

By: [The Two Oceans Aquarium Education Foundation](#)

SharkSafe Barrier Design Decision Support System (CAP04)

When the development of coastal infrastructures is considered, environmental factors such as currents, waves and winds together with geotechnical conditions are needed to inform the design of a sustainable infrastructure.

Although the required data are now available, they are

scattered over various databases, which can lead to prolonged designing and costing processes, specifically for SMEs and startups with limited human resources. The objective is to develop a system to source and collate environmental, geotechnical and infrastructure data to inform optimisation of SharkSafe Barrier installation.

By: [SharkSafe Barrier](#)

THE WINNING TEAM FROM CAPE TOWN

RADAR AT SEA: USING LAND-BASED HIGH-FREQUENCY RADAR SYSTEMS TO MONITOR RISKS OF IUU FISHING (CAP01)

With 1,535,538 km² of marine space, protecting South Africa from IUU (Illegal, Unreported and Unregulated) fishing is challenging for fisheries control authorities.

Due to other countries running out of fish and starting to move south to catch more fish, South Africa has seen IUU Fishing on the rise, costing the economy around R6 billion each year.

The aim was to develop a prototype of Machine Learning application that uses high-frequency (HF) radar systems data to detect ships at sea and hence risks of IUU fishing should the detected ship not be sharing its AIS signal.

By: [CLS Southern Africa](#)



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WHY DID YOU ORGANISE OCEAN HACKATHON® IN KLAIPEDA?



We, as Klaipeda science and technology park, regularly organize various events: hackathons, conferences, trainings, workshops. This event interested us because it is a different kind of hackathon - a hackathon where solutions are based on data. We wanted to gather experts, companies, students who work with data and know how to apply it in solving challenges. We expected that this event will be attractive for our stakeholders, city municipality as they will be the main participants in our event. This event brought us a new experience of working in a big consortium for the common purpose of gathering specialists and experts from different fields.

CHALLENGES IN KLAIPEDA

Synchronized traffic application (KLD02)

Traffic is a source of air pollution, noise, traffic. Part of these negative consequences are caused by incoming, outgoing traffic to port (ferry operating on the principle of transit flow). The negative impact of traffic generated by the port on the population (air pollution, noise, traffic conflicts) is increasing accordingly. Addressing this challenge would eliminate the negative impact of port-generated traffic on the population and partially reduce the congestion on the city's streets. The goal is to create a synchronised traffic application after synchronizing the data of ferry operations in the port and cargo movement data from the port area with the intelligent city traffic management system.

By: [Klaipeda State Seaport Authority](#)

Coastal flood risk alert (KLD03)

The real-time warning system for Dane River flood risk is relevant as the river flows through the city of Klaipeda, where the Lithuanian seaport, production, farm infrastructure, and residential areas are located. Extreme situations during storms form when the Dane River discharge increases due to heavy rainfall, and the water levels in the Baltic Sea and the Curonian Lagoon rise due to wind floods.

By: [KU Marine Research Institute](#)



© Klaipeda science and technology park

REAL-TIME PLATFORM TO MONITOR INFLOW OF SALTY WATER (KLD01)

SC «Klaip dos vanduo» faces a challenge that affects the activities of the 3rd water site - salty water (of the Baltic Sea) enters through the Dreverna sluice into the Vilhelm canal from which water is taken for the residents of the southern part of the city.

The company is inviting teams that would use hydrometeorological data to create a hydrodynamic model that would show the current situation in real-time by using the available data. The aim is for this real-time platform to send warning signals to the SC «Klaipedos vanduo» for a quick response to the changing water situation.

By: SC "Klaipedos vanduo".



© Klaipeda science and technology park



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WHY DID YOU ORGANISE OCEAN HACKATHON® IN KUALA LUMPUR?



**AMBASSADE
DE FRANCE
EN MALAISIE**

*Liberté
Égalité
Fraternité*

Malaysia is a truly maritime nation, hosting amazing marine biodiversity but also facing significant challenges. Ocean Hackathon Kuala Lumpur highlighted the outstanding research performed across some of the major universities in the country - and the crucial need for centralized ocean databases. It also brought together people from multiple backgrounds and ages in a fun and safe collaborative space, in the interest of ocean preservation. This very successful first Malaysian edition shall certainly be followed by many more!

CHALLENGES IN KUALA LUMPUR

An application for an Autonomous Sailboat for Marine Environment Monitoring (KUL01)

An IoT-based autonomous sailboat has been developed to collect and analyze ocean water quality data. It is equipped with sensors, microcontrollers and a wireless communication module that allows for the collected data to be subsequently uploaded to cloud services. After analysis, the data is translated into a visual format accessible through a mobile application; the user can therefore monitor ocean water status real-time.

By: Ang Yee Teng

Microplastics: The Ocean's (and Humanity's) Downfall (KUL02)

Although the importance of the oceans is widely acknowledged, ocean pollution keeps growing; microplastics have become a massive threat to all living organisms, whether they live in the oceans or not. The proposed challenge aims at developing a website that spreads awareness on this issue and presents to the general public all the species that have already been contaminated with microplastics.

By: Redzuan Shah

Climate change educational games (KUL03)

Clear indicators of a global climate crisis have been documented including large concentrations of greenhouse gases in our atmosphere, high levels of deforestation, rising global and sea surface temperatures, sea level rise, and drought. Climate change has a negative impact on every habitat and its effects are particularly harmful on vulnerable groups. Our game aims at improving our understanding of climate change and boosting our communities' resilience.

By: Jacey Minoi et Jaya Laxshmi

Mobile app to detect marine benthos coverage in rock pools (KUL04)

Natural rock pools in intertidal and subtidal zones are high in biodiversity. Due to climate change and urbanization, man-made infrastructures have replaced natural habitats in many coastal cities, thus affecting natural environments. Our mobile application will help scientists monitor biodiversity in natural and artificial rock pools, by estimating the coverage of marine life (particularly benthos), based on the analysis of a picture or a video.

By: Amanda Ching Kar Mun and Su Yin Chee

IUU Fishing (KUL06)

IUU fishing stands for illegal, unreported and unregulated fishing. IUU fishing represents a severe threat to endangered marine species and a large source of plastic pollution at sea, due to damaged and discarded fishing nets. The challenge is to gamify the learning experience about the direct and indirect impacts of IUU fishing, ranging from damages to marine ecosystem and economic activities (e.g. recreational diving) to seafood security.

By: B. Mabel Manjaji Matsumoto

Social innovation IoT-based to repel infestation in dried fish (KUL07)

Fish drying is a traditional, low-cost and simple procedure that brings crucial additional income to marginalized women in the coastal fishing villages. However, dried fishery products frequently suffer severe losses in quality and quantity due to infestation by flesh flies, beetles and mites. Our objective is to develop a cutting-edge IoT system to ward off pests while drying fish. Based on the use of ultrasonic waves, it will cause minimal environmental damage.

By: Jacey-Lynn Minoi

An early warning system to address water pollution around Penang Island (KUL08)

Development on Penang Island has coincided with sharp spikes in water pollution along its coastline. Effluent from factories, ship spills, illegal dumping, sewage, and debris cause substantial damage to aquatic habitats such as corals and seagrass. We aim at developing a model that uses recording of weather and multiple parameters related to water quality to quickly identify pollution around the coast of the island and potentially limit its impact.

By: Abe Woo

A machine learning approach for early detection and warning of algal blooms in regional water (KUL10)

Early detection of harmful algal blooms (HABs) is essential for (1) protecting the health of marine ecosystems, (2) preventing huge economic losses for coastal fisheries and (3) reducing their impact on human health (e.g. paralytic shellfish poisoning). By using the climate and satellite data available in our regional water, a machine learning approach is proposed to study the past HAB events and develop an early warning system, as a mitigation measure.

By: Zhi Yong Kang

THE WINNING TEAM FROM KUALA LUMPUR

DEVELOPMENT OF THE FIRST PREDICTION MODEL FOR THE JELLYFISH DISTRIBUTION & APPEARANCE IN PENANG ISLAND (KUL05)

Due to their painful and, in some cases, fatal stings, jellyfish have serious detrimental effects on the tourism industry in Malaysia – and Penang Island has been particularly affected by their blooms.

The challenge aimed at developing a model to predict the blooming period and occurrence of jellyfish around the coastal area of Penang. Initially, a set of data issued from comprehensive and long-term monitoring carried out by CEMACS-USM (Centre for Marine and Coastal Studies -University Sains Malaysia) in 2017 was used.

The model, integrated in an application, will be subsequently enriched by data on jellyfish abundance collected through citizen science.

The app also provides information on first aid assistance for jellyfish stings through a smart image detection system offering advice on the best response for the incident.

By: Sim Yee Kwang, Senior Science Officer at CEMACS-USM



© Courtesy of CEMACS-USM

WHY DID YOU ORGANISE OCEAN HACKATHON® IN LA ROCHELLE?



We have been organizing an Ocean Hackathon for 3 years. So, that's why we decided to continue this event this year. It's really really nice to see people work together and create something within 48 hours.

CHALLENGES IN LA ROCHELLE

Interactive system linked to MARITIME weather risks (LAR01)

Design an interactive system for educational purposes as a vector of scientific mediation.

The analysis and understanding of marine hazards and extreme phenomena of the past make it possible to better understand those to come, the frequency of which could increase with the ongoing global warming.

By: Frédéric Surville

How to feed 10 billion citizens without damaging the ocean and the biodiversity? (LAR02)

The challenge is quite simple: we need to find solutions to feed equally 10 million citizens which could be the worldwide population in 2100.

Solutions have to be low-tech as much as possible.

Feeding the population is an ecological emergency and a social issue.

By: Julien Gerbet

Before sobriety, will we run out of water? (LAR03)

May 2022, 24 departments on drought alert in metropolitan France, resulting in water restrictions.

This fact is not new, but exceptional for a month such as May. Since the 2000s, drought alerts have been regular on our territory, in particular, due to the nature of the soils.

The effects of the lack of water are now visible all year long and the repercussions on ecosystems and people are very worrying.

By: Fabrice Augereau

Oyster shell: local ecological filter for waste recycling (LAR04)

The recycling of our waste is essential, the objective of our project is to link recycling and maintenance of the house by creating filters based on oyster shells.

By: Elodie Savarin



© La Rochelle advisers

Three oceans for one arrival #wego2025 (LAR06)

We want to create a digital application allowing boats to calculate the optimal window for their departure.
The routing will take into account wind, currents, waves and other meteorological data.
Motorized portions and stopovers will also be calculated.

By: Jean-Emmanuel Frantz



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THE WINNING TEAM FROM LA ROCHELLE

SILENCE IN THE OCEAN (LAR05)

Underwater noise generated by human activities affects all marine species.

This noise pollution has been recognized as pollution and a threat to ecosystems since 2005 by the United Nations and then in 2010 by France.

In addition to technical improvements, is it not interesting to concentrate this noise in certain specific areas and, on the contrary, to restrict noise pollution in certain spaces according to the distribution of the species affected in the ocean.

By: Corentin Berger



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WHY DID YOU ORGANISE OCEAN HACKATHON® IN NOUMÉA?



We participated in the Ocean Hackathon for the second time, after the success of the first edition. New Caledonia is an island concerned by all the ocean issues. Our future depends on the development of technological solutions to preserve the environment and especially the ocean.

Ocean Hackathon® is a great experience at all the stages of its organization. The event brings a new way to include Caledonian people into the ecological challenges. It also an opportunity to sensitize participants with the use of marine data applied to the New Caledonians's territory and future.

CHALLENGES IN NOUMÉA

Non professional fishing monitor (NOU01)

Smartphone application for non-professional fishermen to obtain data on recreational fishing, through a gamification principle and a fish recognition algorithm using geolocation and deep learning.

By: CFA CCI, Observatoire des pêches côtières de Nouvelle Calédonie

Nouméa Info Plage (NOU03)

The city of Nouméa is a peninsula with many beaches that are part of the daily life of Nouméans.

The quality of bathing is increasingly important. It concerns the quality of the bathing water, the risk of sharks, the weather, etc. The challenge is to offer a solution that informs and alerts on a daily basis about the quality of the bathing water on the city's beaches «info beach of the day» as well as a predictive part «info beach this weekend».

By: Cyril Barbe

GeoBoat (NOU05)

The solution developed will allow you to book your virtual buoy through a smartphone application so as not to damage the underwater ecosystem around islands and islets.

By: Raoul Iopue

Islands and beaches frequentation (NOU06)

Multi-domain application and monitoring over time. The idea is to have all the information on the frequentation of islands and beaches around Noumea. Contribution of the notion of flows and external explanatory data.

By: Jean Paul Robert



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Ice Breaker (NOU07)

In defining the problem, the focus was on the global stressor that directly affects coral health. Climate change, as a global stressor, is causing an increase in ocean temperature that is leading to coral bleaching, which is an urgent problem for fish and other marine species in terms of coral health, their main ecosystem. This challenge is to improve the monitoring of coral reef health from coral bleaching events using an effective satellite technology strategy and encouraging citizen science through the GeoCoW (Geospatial Coral Watch) prototype that will help local communities protect coral reefs.

By: Thomas Avron

THE WINNING TEAM FROM NOUMÉA

CLEAN UP WRECKS! (NOU02)

Our winning team has developed a web cartography showing wrecks that are full of hydrocarbon and used data to prioritize those that should be solved and treated before giant oil spills around the SPREP region.

The owner of the challenge was Raphaëlle Danis and she has co-worked with three other participants: one developer, one marketing specialist and one wrecks expert.

By: Maria Sabrina Ruiz Freeman



Raphaëlle, Nicolas and Christophe © NeoTech.nc

Geospatial Coral Watch (Papua New Guinea) (NOU08)

In defining the problem, the focus was on the global stressor that directly affects coral health. Climate change, as a global stressor, is causing an increase in ocean temperature that is leading to coral bleaching, which is an urgent problem for fish and other marine species in terms of coral health, their main ecosystem. This challenge is to improve the monitoring of coral reef health from coral bleaching events using an effective satellite technology strategy and encouraging citizen science through the GeoCoW (Geospatial Coral Watch) prototype that will help local communities protect coral reefs.

By: Tigneyuc Sekac



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WHY DID YOU ORGANISE OCEAN HACKATHON® IN SANTIAGO ?



A real opportunity to demonstrate that digital innovation can address solutions to global problems, and that it is possible to create links between different disciplines and countries in order to defend the oceans and the environment.

CHALLENGES IN SANTIAGO

Towards an ecological metadata approach for the prediction of functional responses of marine biota (SAT02)

A precise solution to the methodological problems of the analysis of the alteration of marine ecosystems in the face of environmental changes, such as the lack of taxonomic resolution of species. To this end, they propose linking data based on ecological traits and connecting isotopic functional indices, building a geographic database with previous empirical work throughout the Patagonian region where there are likely to be vulnerable habitats. This solution seeks to address the availability of high-quality empirical data and its georeferencing for better management in spatial analysis, thus achieving a better ability to recognize the level of exposure of ecosystems to ecological disturbances in the territory.

By: Claudia Andrade D.

Conservation of the hidden diversity of the deep ocean (SAT03)

Generate an interactive database that allows us to know the diversity patterns of different groups at depth. In addition, the percentage of unknown diversity and the environmental variables that may be affecting this pattern.

By: Carolina Gonzalez

Generating and exploring ideas for developing a global Ocean Oxygen Database and Atlas (G02DAT) (SAT05)

Faced with the growing threat of deoxygenation of the oceans and the repercussions it causes in marine ecosystems, it seeks to create a standardized database of data related to this phenomenon in Chilean territory. This global database is called G02DAT and its solution is part of the activities planned by the United Nations to raise awareness of the consequences of deoxygenation, called GOOD. This project will provide knowledge for action against these environmental effects by facilitating access to scientific work in this area, thus strengthening academic collaboration and innovative dissemination.

By: Boris Dewitte



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THE WINNING TEAM FROM SANTIAGO

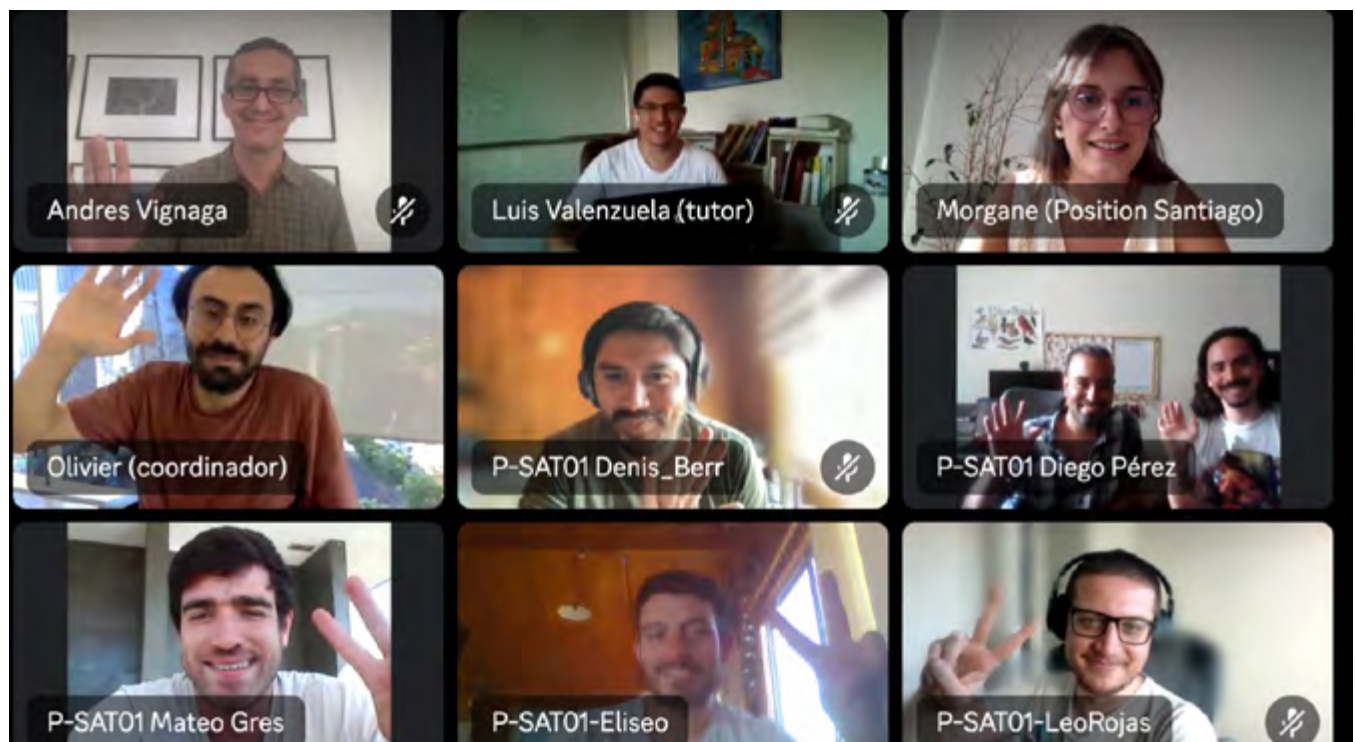
SATELLITE MONITORING OF KELP FORESTS: EFFORTS FOR A NEW SPATIO-TEMPORAL SCOPE (SAT01)

The challenge proposes to use a multi-spectral filter of satellite images used in remote studies of Kelp forests. For 48 hours the team will seek to summarize this information in a way that is useful for the study and management of these systems.

This is due to the high level of spatio-temporal resolution, the technical complexity of access and the analytical skills required to process this information.

For this purpose, it intends to develop a time series code, pass it to a code in R or Python and finally visualize it in some platform.

By: Eduardo Guajardo



© Adviser from Santiago

WHY DID YOU ORGANISE OCEAN HACKATHON® IN SAUSALITO-SAN FRANCISCO?



The Sustainable Ocean Alliance highly valued its incredible Sausalito-based partners at the Center for Sea Rise Solutions because it brought together a localized effort to address some of the most pressing threats to our ocean and climate's health. Throughout the weekend, the value of convening SOA's global community was evident all around us. We were

thrilled to welcome SOA Partners and Mentors to the program as jury members, Hub Members as event participants, Ecopreneurs as challenge owners, and Mentors as key supporters throughout the Hackathon. This event was truly a convening that represents the power of our work as a global Alliance dedicated to ocean leadership and generating creative solutions to protect our ocean.

CHALLENGES IN SAUSALITO-SAN FRANCISCO

Quantifying seaweed farms through satellite imagery - Monica Moritsch (SAU02)

A machine learning algorithm to estimate the number and area of seaweed farms in the world from Planet or other high resolution satellite imagery.

By: [Environmental Defense Fund](#)

Overlaying offshore wind plans with habitat types that can be restored for specific species (SAU03)

As offshore wind takes off around the world, having a map which shows the planned construction locations overlayed on habitat types such as seagrass or rocky reefs would enable eco engineers to plan accordingly. The second stage would be to identify key species to that area, whether they be endangered, commercially appealing or unique to that area and need protecting. This will allow projects to be able to efficiently implement measures that can help restock, sustainably harvest or protect.

By: [ARC Marine](#)

How can we accelerate electrification of maritime vessels (SAU05)

Methodology for gathering operational data to support data analytics solutions to optimize vessel operations, routing and port calls. Methodology for using geospatial data to track and analyze ship operations. Opportunities for increasing digitization and connectedness to increase fuel efficiency, compliance and performance audits and operating cost reductions.

By: [Sausalito working waterfront coalition](#)

AI for Coral Bleaching (SAU06)

Use the images derived from underwater monitoring and design image segmentation models to make out the percentage of bleaching corals in each image. This final level will allow us to obtain a deeper understanding of the coral reef's health and resiliency.

By: [Reef Support B.V.](#)

[\[More information about the projects\]](#)



© Adviser from Sausalito

REAL TIME COASTAL USES TRACKER (SAU01)

Cascais Municipality is located in Portugal, in the Lisbon Metropolitan Area. It has 32 km of coastline and more than 200 000 habitants. It has 1 fishing harbor and a marina that enables access to the sea.

It also has the 1st local Marine Protected Area in Portugal.

A big gap in Cascais Sea Strategy is nautical information, the different usages observed in our coastline are not accurately mapped, and different activities frequently occur in the same area, creating conflict.

Lack of sea surveillance in the coastal zone of the Municipality enables the existence of illegal fishing activities masked as nautical activities, creating a biodiversity conservation problem and a sense of injustice to our local fisherman.

A real time coastal uses tracker, that would be easy to use in a mobile phone or in a portable device, allows the creation of patterns of usages by the different entities operating in Cascais Sea, it would also enable the detection of illegal entrances of a motor vehicle in our local marine protected area.

This type of information will allow the correct management of Cascais Sea, contributing to a stronger enforcement of the current regulations and predicting possible conflicts of users.

By: Cascais Municipality.



© Adviser from Sausalito



© Adviser from Sausalito

WHY DID YOU ORGANISE OCEAN HACKATHON® IN TOULON?



We decided to organize the Ocean Hackathon® in order to bring together data producers, entrepreneurs using data and players of the sea to work together on a common project.

We also want to make students aware of the world of the sea and allow them to work in multi-skills and open their experience on the creation of business and thus allow a regional influence of Toulon.

CHALLENGES IN TOULON

Delphinia (TOU01)

Based on research results on mutualism between corals and dolphins, a Business Model based on collective intelligence for the protection of the marine ecosystem - notably through global CSR actions positively impacting local geographical areas.

By: [Delphinia](#)

Oasis (TOU04)

Inspired by nature to produce drinking water from sea water and recover the potential energy produced by the system. The design has been particularly worked to achieve a modular structure that integrates perfectly into the environment and eco-built.

By: [HELIO Marine Tech](#)

CloudIA (TOU05)

Facing the sea, all opportunities take shape. An AI specially trained to discover the maritime professions and the training courses to access them. A platform that adapts to the profiles, ambitions and personalities of each person to guide them!

By: [4med Campus des Métiers de la Mer - Université de Toulon](#)

Vidon brevet (TOU07)

A didactic and playful web application to simplify patent searches.

By: [Vidon - Propriété Intellectuelle](#)

Aquabell (TOU08)

Artistic underwater structures to provide habitat for fish and protect them from fishing.

By: [GlobOcean](#)

The Seed Ship (TOU10)

Assistance in the creation of marine protected areas via interactive maps (QGIS) and predictive approach.

By: [The Seed Ship](#)



© TVT

THE WINNING TEAM FROM TOULON

RASCASSE - SEA TIZEN (TOU06)

Using advanced AI, we want to create a divebook with the objective of recognizing the different species encountered and mapping the extent of invasive species in coastal waters.

By: Kilian Bürgi and Laurent Barbat



© TVT



© TVT

OCEAN HACKATHON® INTERNATIONAL GRAND FINALE

On 9 February 2022, the Campus mondial de la mer team welcomed the 12 winning teams from the local events of December 2022. In the morning, they tested their presentations and rehearsed their pitches in “Les ateliers des Capucins” (Brest), the biggest covered public square in Europe. In the afternoon, it was time for the pitch contest in front of the jury. Three teams were in remote. The International Grand Finale was very intense full of innovative projects and international exchanges, and so much joyful atmosphere. The jury composed of representatives of both the Ambassadors and the city advisers had the heavy task of scoring the projects live.



Linwood Pendleton, Environmental economist and Executive Director of the Ocean Knowledge Action Network (KAN)

And also a keynote speaker

Building Diverse Teams for Ocean Sustainability

Creating new tools for ocean challenges requires a transdisciplinary approach - one that merges a variety of disciplines, genders, approaches, and ideally end-users in the co-design and co-production of the tool.

While the Ocean Hackathon® provides only limited scope to include all of the people and disciplines necessary to build a truly transdisciplinary team, those OH participants that are able to put together transdisciplinary teams often create the most innovative and useful tools.

But doing so is not easy and in some cases even requires teams to work across linguistic divides.

In this keynote, I will explore some of the challenges of creating transdisciplinary teams and networks and how the Ocean Knowledge Action Network is addressing these challenges to create global, transdisciplinary teams for the co-design of ocean science and knowledge.

THE JURY

Representatives of the cities

- Abidjan: Valérie Noëlle KODJO DIOP, BOAD
- Boulogne-sur-mer: Amandine DUBOIS, CMQ AVCPA
- Brest: Françoise DUPRAT, Technopôle Brest-Iroise
- Cape Town: Herland CERVEAUX, OceanHub Africa
- Klaipeda: Andrius SUTNIKAS, Klaipeda Science and Technology Park
- Kuala Lumpur: Stella ALEXANDROFF, OceanKAN
- La Rochelle: Amandine MOURET, Excelia Group
- Mexico: Octavio GOMEZ RAMOS, UNAM Servicio Mareográfico Nacional
- Sausalito: Jessica NEWFIELD, SOA
- Santiago: Nayat SÁNCHEZ PI, Inria Chile
- Toulon: Leïla BELMERHIA, TVT

Representatives of the Ambassadors

- Cedre: Stéphane LE FLOCH
- Cerema: Julia JORDAN
- Cluster Maritime Français: Alexandre LUCZKIEWICZ
- EMODnet: Tim COLLART
- Ifremer: Pierre SERODES
- Le Village by CA: Juliette NIGRELLI
- Météo France: Christophe MESSENGER
- Oceanopolis: Tristan HATIN
- SE Me : Minh Tâm HUA
- Shom: Laurent KERLEGUER



Ocean Hackathon® 2022 – The 3 winners (Kuala Lumpur, Toulon and Cape Town) © Technopôle Brest-Iroise

AND THE WINNERS 2022 ARE...



The team from Kuala Lumpur. The award was presented by Laurent Kerleguer (Shom) and Julia Jordan (Cerema). © Technopôle Brest-Iroise

1st place on the podium: KUALA LUMPUR

Development of the first prediction model for the jellyfish distribution & appearance in Penang Island (KUL05)

Predicting jellyfish blooms in the coastal area of Penang (Malaysia) is one of the solutions to limit the negative impact of these marine organisms on tourism in Malaysia.

The model is based on scientific data but also from participatory science.

An associated application allows bathers to have information on jellyfish infested areas and assistance in case of sting.

"It's been a great pleasure and honor to participate in the Ocean Hackathon 2022. The journey, experience, knowledge, and network I gained was priceless.

Besides that, to be able to travel to France and won the Hackathon? That was a huge bonus and will remain as one of my greatest achievement." – Kok Herng, teammate of Kuala Lumpur

2nd place on the podium: TOULON

Sea Tizen The social divebook that helps preserve marine biodiversity (TOU06)

Seatizens is a mobile logbook that allows divers to record their best experiences and keep them at hand. It features an image recognition algorithm and a search engine based on ChatGPT that allows to find species encountered underwater with a simple verbal description. Invasive or endangered species? Scientists lack data. They rely more and more on citizen science programs to fill this gap: we integrate these geolocated surveys and then provide them with the data, free of charge. With over 6 million divers worldwide, Seatezens is the way for divers to enhance their experience while actively contributing to the preservation of marine biodiversity.

Link to the project: <https://weareseatizens.com/>



The multidisciplinary (biologist, data scientist, engineer, designers, etc) team from Toulon. the award was presented by Stéphane Le Floch (Cedre) and Pierre Serodes (Ifremer) (not on the photo).

3rd place on the podium: CAPE TOWN

Radar at Sea: Using land-based high-frequency radar systems to monitor risks of IUU fishing (CAP01)

Illegal, unreported, unregulated (I.U.U.) fishing and the trafficking of humans and drugs are serious global issues enabled by limited ocean monitoring. Representing Cape Town, South Africa, team SeaFar trained a deep learning model to predict the locations of ships up to 150km from the coast using high frequency radar data. In close to real-time, the model could predict ships that were disconnected from the Automatic Identification System, as is usually the case for ships conducting illegal activities. Typically used to monitor ocean surface currents, HF-Radar infrastructure requires minimal capital investment compared to competing technologies, making it suitable for nations with limited resources available for marine protection.

Link to the pitch: <https://www.youtube.com/watch?v=XYHokLozTzo..>



The team from Cape Town. the award was presented by Christophe Message (Météo France), Tristan Hatin (Océanopolis) and Gina Guerreiro-Herry (Le Village by CA Finistère). © Technopôle Brest-Iroise

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.



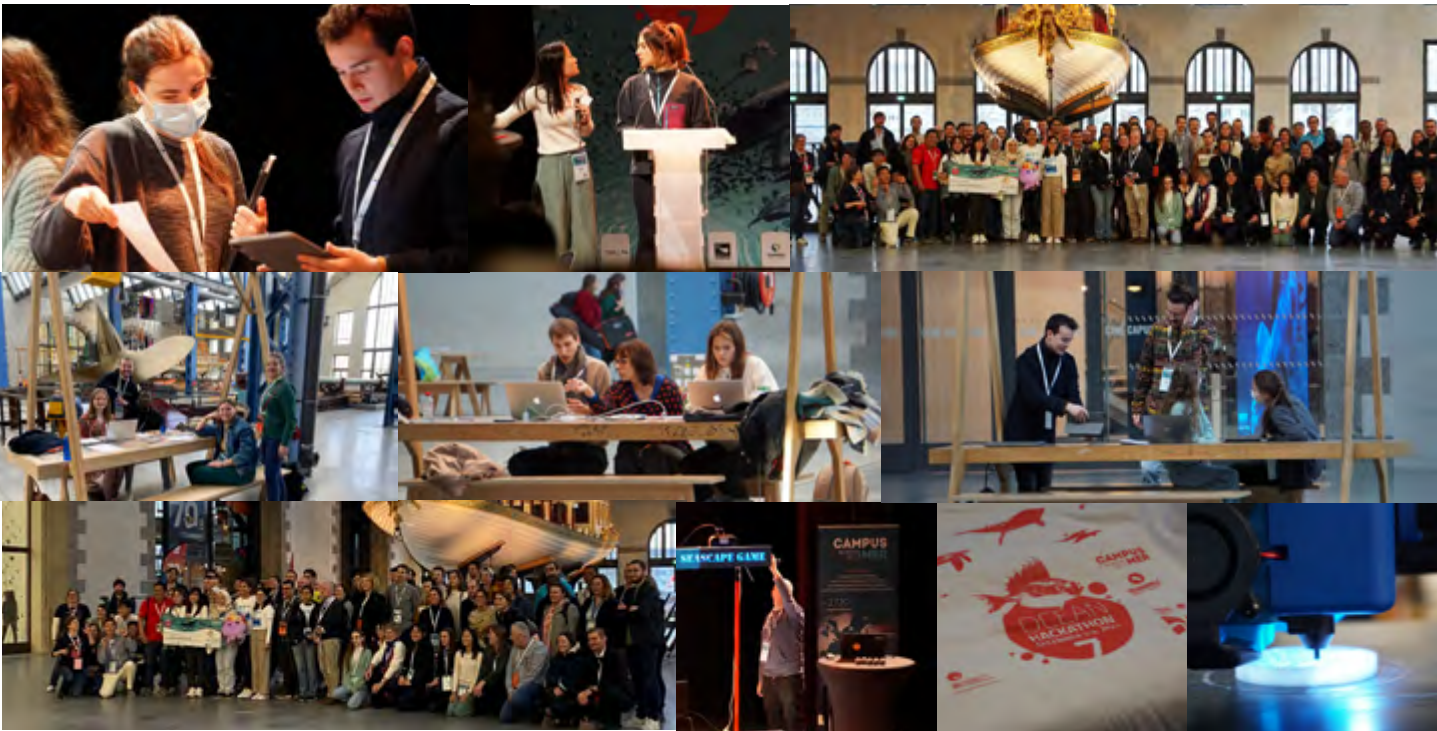
Ocean Hackathon® 2022 – the participants of the International Grand Finale and present in Brest.



Medley : <https://youtu.be/3gCEoUxzFw>



Replay GF : <https://www.youtube.com/live/Ybh506JUSTU?feature=share>



Ocean Hackathon® 2022 © Technopole Brest-Iroise

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