



# 2021 EMBRC Annual Report



**EMBRC**  
EUROPEAN  
MARINE  
BIOLOGICAL  
RESOURCE  
CENTRE





# Table of contents

<a href="#"><u>Letter from the Executive Director</u></a>	<a href="#"><u>3</u></a>
<a href="#"><u>Mission, vision, values</u></a>	<a href="#"><u>5</u></a>
<a href="#"><u>2021 in numbers</u></a>	<a href="#"><u>6</u></a>
<a href="#"><u>Highlights from 2021</u></a>	<a href="#"><u>7</u></a>
<a href="#"><u>About EMBRC</u></a>	<a href="#"><u>8</u></a>
<a href="#"><u>What we do</u></a>	<a href="#"><u>8</u></a>
<a href="#"><u>Where we work</u></a>	<a href="#"><u>8</u></a>
<a href="#"><u>Our history</u></a>	<a href="#"><u>9</u></a>
<a href="#"><u>EMBRC members</u></a>	<a href="#"><u>10</u></a>
<a href="#"><u>A wealth of marine biological resources</u></a>	<a href="#"><u>10</u></a>
<a href="#"><u>EMBRC services</u></a>	<a href="#"><u>11</u></a>
<a href="#"><u>Overview</u></a>	<a href="#"><u>11</u></a>
<a href="#"><u>Services in 2021</u></a>	<a href="#"><u>13</u></a>
<a href="#"><u>User stories</u></a>	<a href="#"><u>22</u></a>
<a href="#"><u>Service developments</u></a>	<a href="#"><u>27</u></a>
<a href="#"><u>Access and benefit-sharing (ABS)</u></a>	<a href="#"><u>37</u></a>
<a href="#"><u>EMBRC guides on ABS</u></a>	<a href="#"><u>38</u></a>
<a href="#"><u>Contribution to international debates on access to marine resources and 'DSI'</u></a>	<a href="#"><u>39</u></a>
<a href="#"><u>ABS, sample permits, Open Science system, FAIRification</u></a>	<a href="#"><u>39</u></a>
<a href="#"><u>Training: Supporting the next generation of marine biologists</u></a>	<a href="#"><u>41</u></a>
<a href="#"><u>Marine Training Network and IMBRSea</u></a>	<a href="#"><u>41</u></a>
<a href="#"><u>Virtual tours</u></a>	<a href="#"><u>43</u></a>
<a href="#"><u>Projects</u></a>	<a href="#"><u>44</u></a>
<a href="#"><u>Overview</u></a>	<a href="#"><u>44</u></a>
<a href="#"><u>New projects</u></a>	<a href="#"><u>45</u></a>
<a href="#"><u>Ongoing projects</u></a>	<a href="#"><u>49</u></a>
<a href="#"><u>Communications</u></a>	<a href="#"><u>58</u></a>
<a href="#"><u>Campaigns</u></a>	<a href="#"><u>58</u></a>
<a href="#"><u>Social media</u></a>	<a href="#"><u>61</u></a>

<u>Website and publications</u>	64
<u>Internal communications</u>	68
<u>Other communications activities</u>	69
<b><u>EMBRC team</u></b>	<b>70</b>
<u>Policies</u>	70
<u>New staff at HQ</u>	72
<u>Collaboration</u>	73
<b><u>EMBRC nodes: presentation and 2021 highlights</u></b>	<b>74</b>
<u>EMBRC Belgium</u>	74
<u>EMBRC France</u>	76
<u>EMBRC Greece</u>	79
<u>EMBRC Israel</u>	81
<u>EMBRC Italy</u>	82
<u>EMBRC Norway</u>	84
<u>EMBRC Portugal</u>	85
<u>EMBRC Spain</u>	86
<u>EMBRC UK</u>	88
<b><u>Partnerships</u></b>	<b>89</b>
<b><u>Executive Director</u></b>	<b>89</b>
<u>EMBRC membership</u>	89
<u>Collaborations and networking</u>	91
<u>RI community</u>	93
<b><u>Governance</u></b>	<b>94</b>
<u>General Assembly</u>	94
<u>Committee of Nodes</u>	97
<u>EMBRC-ERIC organigram</u>	99
<b><u>Financial report</u></b>	<b>100</b>
<u>Income</u>	100
<u>Expenses</u>	101
<u>External funding sources</u>	102
<b><u>Publications</u></b>	<b>103</b>
<u>Overview</u>	103
<u>Publications in 2021</u>	105
<b><u>Annex</u></b>	<b>106</b>
<u>List of EMBRC operators and sites</u>	106
<b><u>Acronyms</u></b>	<b>108</b>

# Letter from the Executive Director



Dear reader,

Welcome to the 2021 EMBRC Annual Report! I am pleased to share with you our achievements from the past year. Despite the ongoing COVID epidemic, we made strides in improving our research infrastructure (RI), developing services, and thoroughly moving into our operational phase.

First and foremost, I am excited to announce the arrival of EMBRC's 10th member country: Sweden. As a member of the EMBRC preparatory phase, our Swedish colleagues have been missed and we are thrilled to finally welcome them back amongst us. They bring in seven new operators to our RI and finally allow EMBRC to gain access to the Skagerrak region of the North Sea and the Baltic Sea.

In terms of service provision, our *raison d'être*, 2021 saw some noteworthy changes in user behaviour and exciting opportunities for early career researchers. We witnessed a switch among many users to remote services, which may remain the norm after the 'post-COVID era'. Successful recipients of our first joint call with EuroMarine carried out many interesting research projects throughout the year.

After two years of intensive preparation, it was with huge pride and satisfaction that we launched a two-year genomics observatory pilot programme: European Marine Omics Biodiversity Observation Network (EMO BON). The first sampling took place in June 2021 and the first data sets will be released in 2022. Becoming a data producer in the context of EMO BON means that new, exciting opportunities are opening up for EMBRC in the data realm. Consequently, our e-Infrastructure Working Group became very active in 2021, preparing our new Data Management Plan among other tasks.

We also became more active in the domain of biodiversity observation. In 2021, we participated in several workshops on marine observation and had preliminary discussions with the Marine Biodiversity Observation Network (MBON). In addition, we were invited to the World Congress of the World Association of Marine Stations (WAMS).

We were also successful in joining three United Nations (UN) Decade of the Ocean Programmes: Marine Life 2030, Ocean Biomolecular Observing Network (OBON), and Marine Practices. Finally, we were successful in launching a biological observation working group (BIOWG) in EuroGOOS, aiming to structure, standardise and share protocols on biological observation in Europe.

As a whole, it was a busy year in terms of internationalisation. The RI-VIS project ran three virtual regional symposia for Africa, Latin America, and Australia to encourage collaboration amongst RIs. This led to exciting opportunities in South Africa and Australia that we will continue to pursue in 2022 and beyond. The completion of our best practice guidelines for Access and Benefit- Sharing (ABS),

which we finalised and started sharing in 2021, proved timely for this purpose. A huge amount of work went into producing the guidelines, which will not only help EMBRC partners, but also all providers of marine genetic resources to safely navigate the complex ABS framework. Closer to home, we signed a [memorandum of understanding](#) (MoU) with the European Molecular Biology Laboratory (EMBL).

Our communications continued to gain traction in 2021, with social media campaigns on marine model organisms and marine scientists ('Marine Scientist Monday'), which highlighted famous scientists' contribution to marine science in the past centuries. We also used our communications channels to involve our partners more, and feature node services and the research they are working on. EMBRC is a hugely diverse and exciting universe, and it has been great to see these strengths being brought out for everyone to see. A real highlight was to participate in the European Union's Innovation Days, showcasing what we do to a broad and diverse audience!

We also had some rare opportunities to meet with our colleagues from around Europe. We had the first face-to-face meeting of our Committee of Nodes (CoN) in September, focusing on how to develop EMBRC over the next few years, particularly how we deliver

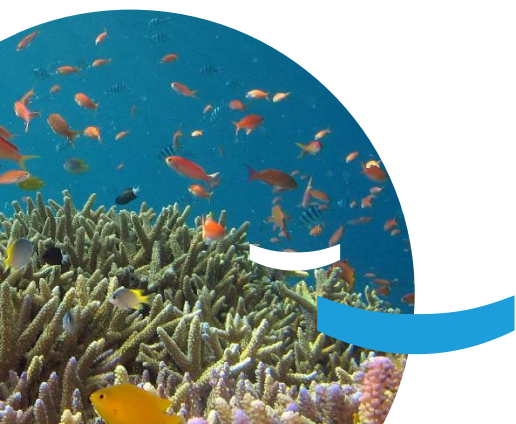
services, centralise services, and standardise protocols. We also welcomed a visit from our Norwegian node coordinator and liaison officer at our Paris headquarters (HQ) in November to discuss future projects.

Finally, we said goodbye to our EMBRC Assistant, Katharine Worley, who moved on to work with the preparatory phase RI DiSCCo. However, with this loss, we gained Guillaume Duspara, who put his skills to excellent use and introduced the EMBRC HQ to some new management tools and systems. We also welcomed Anne Emmanuelle Kervella to the team, who joined us from *Centre national de la recherche scientifique* (CNRS, French National Centre for Scientific Research) to bolster our ABS and internationalisation efforts. Our team continues to grow and diversify, opening up doors to new opportunities.

Sincerely,



Nicolas Pade,  
Executive Director



# Our Mission, vision & values



## Our mission is to:

- Enhance European leadership in marine biology and blue biotechnology through a centrally organised marine science research infrastructure
- Strengthen Europe's and our Members' capacity to access and explore marine biological diversity
- Promote fundamental and applied marine biological science
- Foster the development of new tools, methodologies and experimental platforms
- Promote the use of marine experimental models in mainstream science
- Promote the sustainable use of marine biological resources

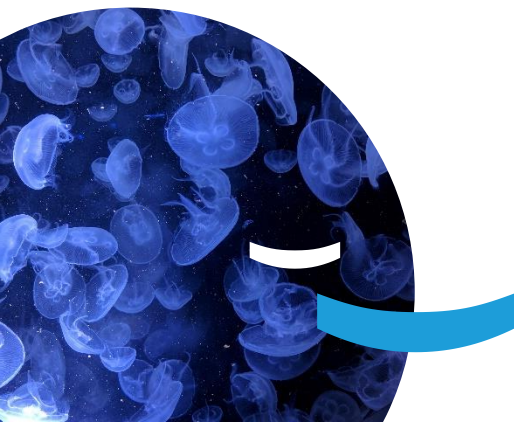
## Our vision is to:

- Advance the understanding of life in the oceans and to sustainably harness its potential for the benefit of humankind

### What we value:

EMBRC values quality and reproducibility in science, and holds itself to the highest ethical standards for working with living organisms, while promoting 'FAIR' (Findable, Accessible, Interoperable and Reusable) data principles.

We value the democratisation of science and support equal access to marine biological resources and experimental facilities.



# 2021 in numbers



**9**

Member countries



**130**

Users in 2021



**100+**

YouTube followers



**438**

Services available



**11**

European projects  
(ongoing & new<sup>1</sup>)



**75,203**

EMBC website views



**213**

Publications<sup>2</sup>



**1500**

LinkedIn followers



**92**

Service requests in 2021



**38,120**

EMBC website users



**46**

Marine stations



**2,600**

Twitter followers

1 This figure includes projects that started in 2021 as well as those which received a positive funding decision in 2021 and will start in 2022.

2 The number of publications includes EMBC-related publications, (co-)authored by EMBC and/or related to an EMBC-coordinated project or resulting from the use of EMBC services. Some publications do not explicitly acknowledge EMBC but have been identified by our partners as being supported by them. Under-reporting and lack of acknowledgement remains an issue for all RIs.








# Highlights from 2021



- Jan** ASSEMBLE Plus (project led by EMBRC) held its first online conference: 'Marine biological research at the frontier'
- Feb** Publication of 'Seek, Keep and Transfer guide: a step-by-step guide to ABS compliance when utilizing genetic resources' on the EMBRC website
- Mar** Publication of the 'EMBRC guide for ABS compliance: Recommendation marine biological resource collections' and users' institutions' on the EMBRC website
- Apr** Kick-off of EOSC Future, an EU-funded H2020 project that is implementing the European Open Science Cloud (EOSC). EOSC will give European researchers access to a wide web of FAIR data and related services.
- May** EMBRC General Assembly (GA) meeting
- Jun** ASSEMBLE Plus Ocean Sampling Day, OSD (starting 21 June) – a campaign where marine biologists around the globe participate in sampling surface waters of the world's coastal areas1st EMO BON sampling (see also 'EMO BON in numbers')
- Aug** 2nd EMO BON sampling campaign
- Sep** Face-to-face Committee of Nodes (CoN) meeting in Faro, Portugal (28-29 Sep)
- Oct** EMBRC 2021 work programme developed
- Nov** Launch of 'A Workflow for Marine Genomic Observatories Data Analysis', an EOSC-Life Open Call Project
- Dec** EMBRC GA meeting

# About EMBRC

## What we do

-  The European Marine Biological Resource Centre (EMBRC) is a European 'research infrastructure' (see box) that provides researchers and companies with access to marine organisms and their ecosystems, as well as the facilities to study them (eg experimental facilities, technological platforms).
-  We work across a wide range of research areas and with diverse stakeholders from academia, industry, technology, and education.
-  We strive to enable all of our users to better understand the ocean's biodiversity and human impact on the oceans, while ensuring the sustainable use of marine resources and promoting innovative solutions to address society's pressing challenges.

## Where we work

-  Headquartered in Paris, we offer researchers across Europe and beyond access to services at our participating marine stations/institutes located throughout European (in 2021, we had nine member countries, and around 50 participating sites, see 'EMBRC members' below). Users can access EMBRC services on-site, remotely, or through a combination of both means.
-  In 2021, we laid the groundwork for the inclusion of a new member country, Sweden, which will join early 2022. There was also a restructuring of EMBRC Italy, which added several new partners, opening possibilities for innovative research.



# Our history

EMBRC was established in 2013 with the aim of 'advancing fundamental and applied marine biology and ecology research' while promoting the development of blue biotechnologies.

## ERIC and ESFRI Landmark status

In 2018, the European Commission granted EMBRC the status of a **European Research Infrastructure Consortium (ERIC)**<sup>3</sup>. EMBRC was designated an 'ESFRI Landmark' on the 2018 European Strategy Forum on Research Infrastructures (ESFRI) Roadmap.

Also in 2018, EMBRC became operational, providing access to services, facilities, and technology platforms in its nine European member countries in support of robust, cost-effective and efficient research.

## What is an RI?

RIs are 'facilities that provide resources and services for research communities to conduct research and foster innovation'. There are several RIs in Europe working across different scientific areas. EMBRC is part of the life science RI community (<https://lifescience-ri.eu>) and the ENVRI community of environmental RIs (<https://envri.eu>).



<sup>3</sup> The European Commission (EC) defines the European Research Infrastructure Consortium (ERIC) as 'a specific legal form that facilitates the establishment and operation of Research Infrastructures with European interest'. The EC further notes that 'the ERIC allows the establishment and operation of new or existing Research Infrastructures on a non-economic basis' (source: <https://bit.ly/34it8hk>).



## EMBRC members



In 2021, EMBRC had nine member countries encompassing 46 marine stations, universities, and research organisations. Members included: Belgium, France (host), Greece, Israel, Italy, Norway, Portugal, Spain, and the United Kingdom. In 2021, EMBRC welcomed Sweden into EMBRC. Their participating sites and organisations will be decided early 2022.

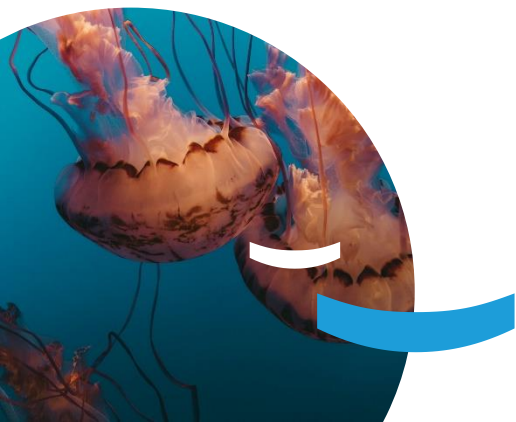


Each country member has one or more 'operators' (ie the legal entities) and sites (the marine stations/institutes delivering services). For the full list of operators and sites (indicated in the map below), see the Annex.

## A wealth of marine biological resources



Our member countries offer a wealth of marine biodiversity and ecosystems for research and innovation purposes, as well as laboratories and facilities dedicated to their study. By making their services, resources, and expertise available to European and international research/innovation communities, we aim to push the frontiers of marine biological science and promote marine solutions to address societal issues (eg global warming, food shortages) and develop novel products, including drugs and food supplements.



# EMBRC services



**Davide Di Cioccio**

**Access Officer**

## Overview



EMBRC services offer researchers limitless possibilities to enhance their marine biology and ecology research. In particular, we offer:

- Access to a wide range of wild and cultured marine organisms
- Facilities to access a wide variety of marine habitats and the ability to study them *in situ* and *ex situ* using our experimental facilities
- A highly flexible infrastructure, able to accommodate most research needs and experimental set-ups, *in situ* and *ex situ*
- Experienced technical staff and broad experience in marine organisms and research methods
- Research and development in new tools, techniques, and experimental platforms for marine biological and ecological research

## Our service categories include:



Ecosystem access



Biological resources



Experimental facilities



Technology platforms



E-services



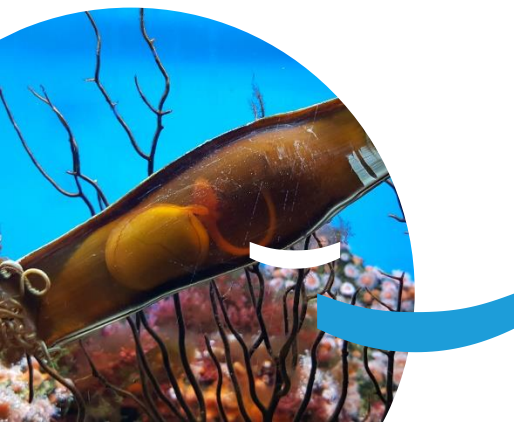
Training & library services



Accommodation & catering

To find out which services EMBRC offers, please explore our service catalogue ([www.embrc.eu/services/service-catalogue](http://www.embrc.eu/services/service-catalogue)) and contact us to see how we can meet your research needs ([access@embrc.eu](mailto:access@embrc.eu)).

Within these service categories, we support both fundamental and applied research. Fundamental research areas include: environmental science, conservation, taxonomy, ecology, physiology, evolution and development, microplastics, climate change impact, and microbiome. Applied research areas include husbandry, culture/biomass, aquaculture, biomedical research, pharmaceutical research, cosmetics, nutraceutical research, agronomy, and biotechnology.



## Services in 2021

2021 saw some noteworthy changes in user behaviour and exciting opportunities for early career researchers. While continuing to cope with COVID travel restrictions and other logistical challenges, we saw a switch among many users to remote services. This is a promising avenue for the future, as we anticipate that users may continue to privilege this access route after the 'COVID era'. Successful recipients of the joint EuroMarine-EMBRC call continued to carry out their research in 2021, with interesting research outcomes.

Below, we highlight some of the major service trends in 2021 and then provide a detailed thematic analysis of user composition and service use in 2021. This is followed by a presentation of a select number of user stories. In the subsequent sub-section, 'Service developments', we feature our EMO BON and bioprospecting services.

### ASSEMBLE Plus and impact on service use

As the ASSEMBLE Plus programme wrapped up, we logically saw a decrease in the overall number of access requests for EMBRC services in 2021. In all, we had 92 access requests, a 71% decrease compared to 2020, where we had 319 access requests. This can largely be explained by the lack of an ASSEMBLE Plus Transnational Access (TNA) call in 2021. TNA enables researchers to get funding to use services at more than 30 European marine institutes (including many of EMBRC's own stations) and has funded more than 500 service requests in recent years.

ASSEMBLE Plus prepared and launched a 9th TNA call early 2022. Projects awarded in this last TNA call will be carried out in summer 2022.

### Remote service delivery on the rise

The sanitary and travel restrictions imposed by the COVID-19 pandemic hindered the delivery of a considerable number of services requiring on-site use. This added to our already considerable backlog of projects from 2020. Some users, preferring not to wait, switched to remote services, signalling a change in behaviour among EMBRC users, traditionally preferring on-site access for platforms, ecosystems, and organisms. For those who did not opt for remote services in 2021, we hope that they will be able to access their services on-site early 2022.

### EuroMarine-EMBRC joint call

Through a joint EuroMarine and EMBRC call, over €52,000 worth of services were awarded, starting in 2020, to 11 successful applicants. The recipients are all early career researchers belonging to EuroMarine member organisations. Their grants cover the costs of their chosen EMBRC research service.


Each of the successful applicants was deemed to have submitted a proposal demonstrating intrinsic scientific value, novelty, and relevance to the general scientific strategy of EuroMarine, as outlined in the EuroMarine Ocean Frontier manifesto.


In 2021, most of these projects were completed. If not, recipients have until July 2022 to do so.




# EMBRC service provision in 2021: thematic analysis

## Number of service requests

 In 2021, EMBRC received a total of 91 access requests, all of which were approved, for a total number of 130 users (-30% compared to 2020). *Note: a single access request can involve one or more users.*

 In all, 103 approved access requests were postponed, which included mostly on-site services as well as some remote ones. The EMBRC liaison officers stayed in close contact with the researchers affected by the delays to find a solution to carry out their projects as soon as conditions allowed.

 Figure 1 (Fig. 1) below shows the status of access requests for years 2018 to 2021; this concerns requests which were approved only and does not indicate the total number of access requests received.

**Fig. 1: Access request status in 2021 and previous years**

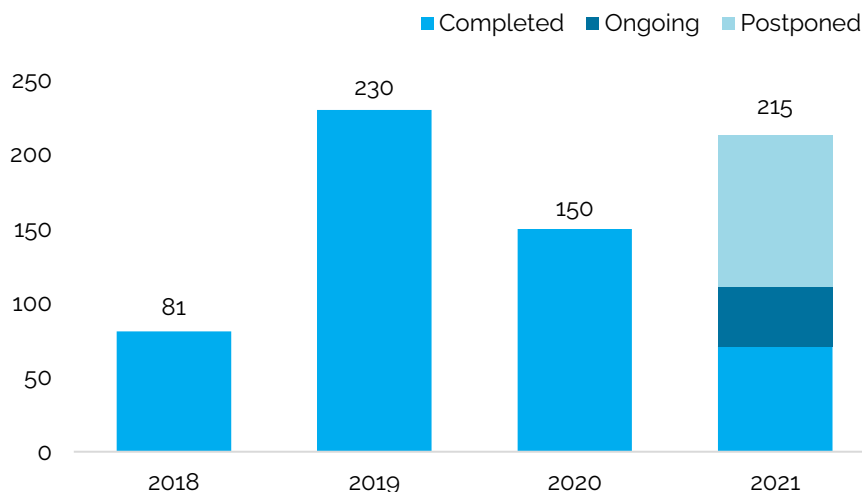


Fig. 1 illustrates the status of approved access requests for EMBRC services from 2018 to 2021, and their status: **turquoise: completed** (ie access delivered), **dark blue: ongoing** (ie access initiated in 2021 yet to be completed in 2022); **light blue: postponed** (ie delivery delayed). In 2021, EMBRC delivered 71 access requests, while 41 access requests were ongoing, and 103 access requests were postponed.

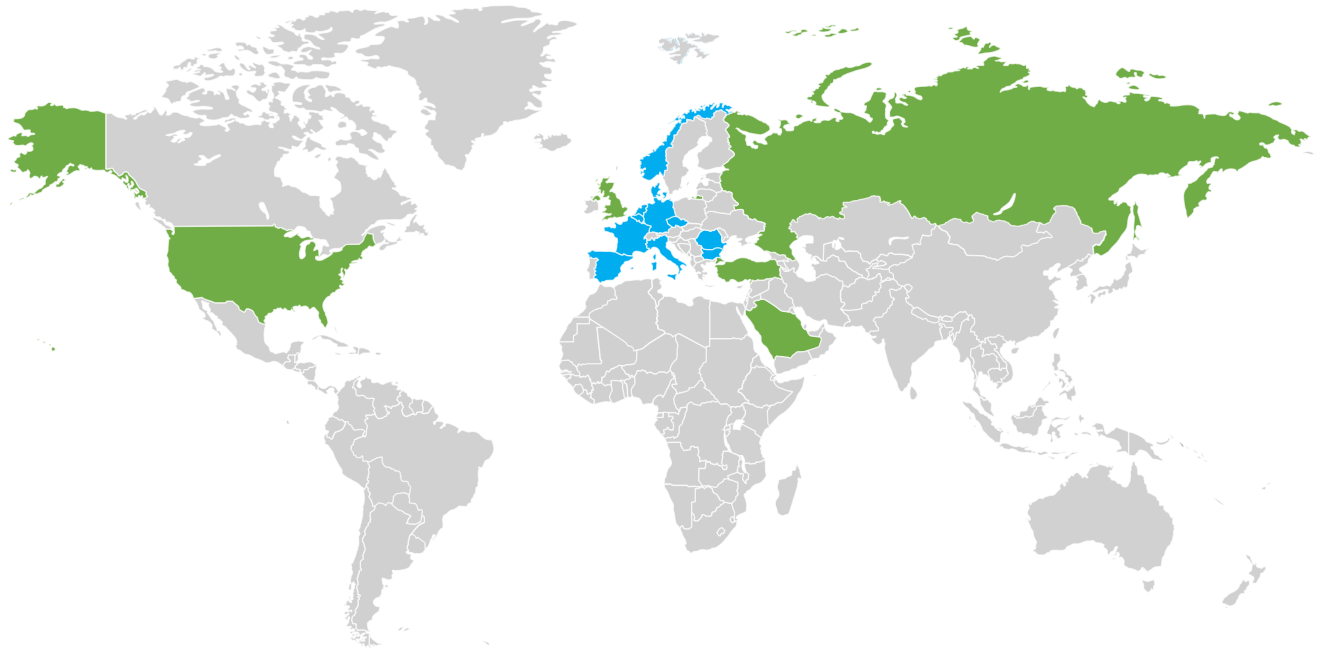
## Geographic distribution of users

 In terms of geographic distribution, most service users were researchers from institutes in European countries (107 users in 2021), in particular from Belgium (46), France (16), and the Netherlands (10) (Fig. 2). Non-European users, who totalled 23 in 2021, came predominantly from the United States, the United Kingdom, Russia, and Aruba, with three users from each country (Fig. 2). The provenance of U.S. users could be explained by its prominence as an international partner, in general; the UK, as an EMBRC member; Russia, by its proximity to Europe; and Aruba, potentially as a constituent country of the Netherlands.

4 This figure includes 'EU associated countries' such as Norway and Israel, which had four and six service requests, respectively, in 2021.



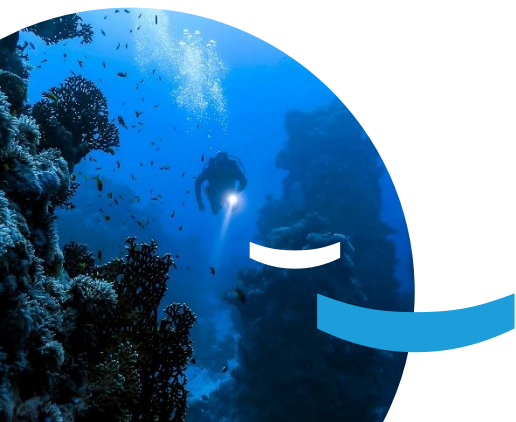
**Fig. 2: Geographic distribution of users in 2021**



**Blue:** users from EU countries and EU associated countries (total: 107 users in 2021)

**Green:** users from non-EU countries (total: 23 users in 2021)

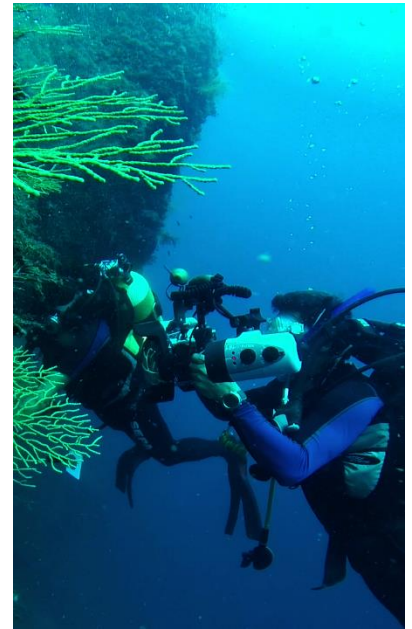
Most service users in 2021 were from Europe (Belgium, France, the Netherlands), with some international users (US, UK and other countries).



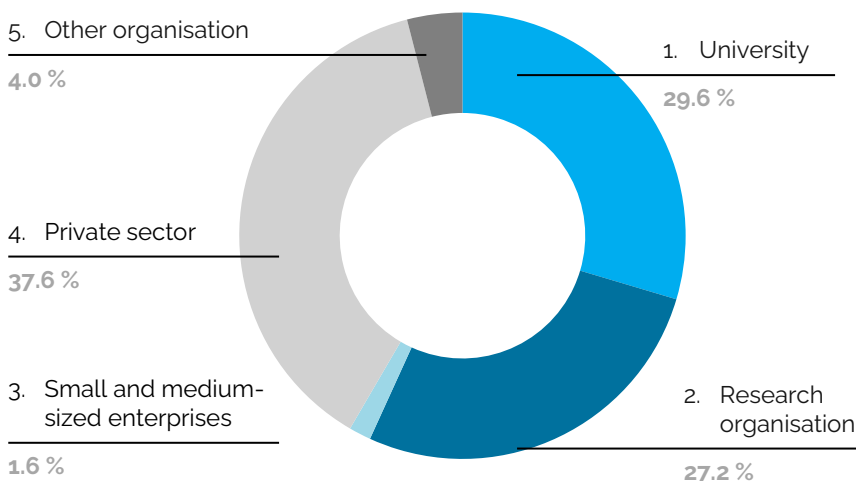
## Home institute type

In terms of user profile, researchers making use of EMBRC services continued to be mostly based in academic institutions (universities and research organisations, 74 users; 56.8%) in 2021. The industrial sector (private, SMEs) and other types of institutes accounted for the remaining 42.8% (Fig. 3). Users from the industrial sector (private, SMEs) totalled 51 (39.2%) and users from other types of institutes accounted for the remaining 4% (5 users, Fig. 3).

While the relative percentage of SME/private company users was higher in 2021 than 2020 (39.2% vs. 12%), the overall number of these users was similar in both years: 51 in 2021 vs. 41 in 2020. The large influx of users received through the TNA programme (who typically come from academic Institutions) may have biased the home institute composition in previous years. As such, there was no major increase in SME/private company users, but rather, a relative decrease in academic users (due to the lack of a TNA call) in 2021.



**Fig. 3: User home institute type in 2021**



*Fig. 3: There was a relative increase in private sector/SME users in 2021 due to the relative decrease in academic users; however, the number of users did not significantly increase compared to previous years (51 private sector/SME users in 2021 vs 41 in 2020).*

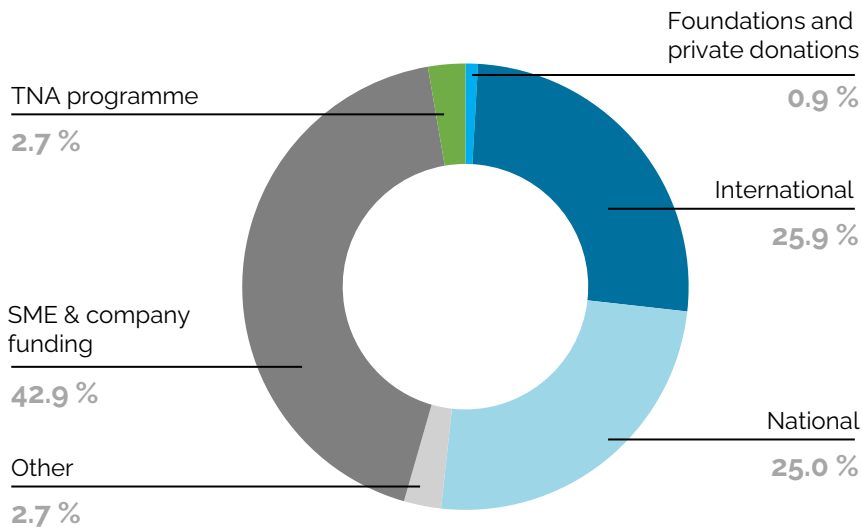


## User funding

The main source of funding to access EMBRC services in 2021 was SMEs'/companies' 'own funding' (56 users, 42.9%). This is in line with the proportion of SME/private company users for the year. In effect, it is expected that these kinds of users will come with their own funds, as opposed to academic users, who will take advantage of international and national funding opportunities such as grants, as well as TNA funding opportunities.

Regarding these types of funding, international funding represented 25.9% of user funding in 2021 (34 users), and national funding represented 25.0% (33 users). Funding from TNA programmes was used by 4 users (2.7%) (Fig. 4). This is a significant shift compared to the previous year, where TNA represented 50.8% of all user funding. Again, this can be explained by the absence of an ASSEMBLE Plus TNA call in 2021. With the inclusion of a final TNA call in 2022, we can expect an increase in this type of funding for 2022.

**Fig. 4: User funding type in 2021**

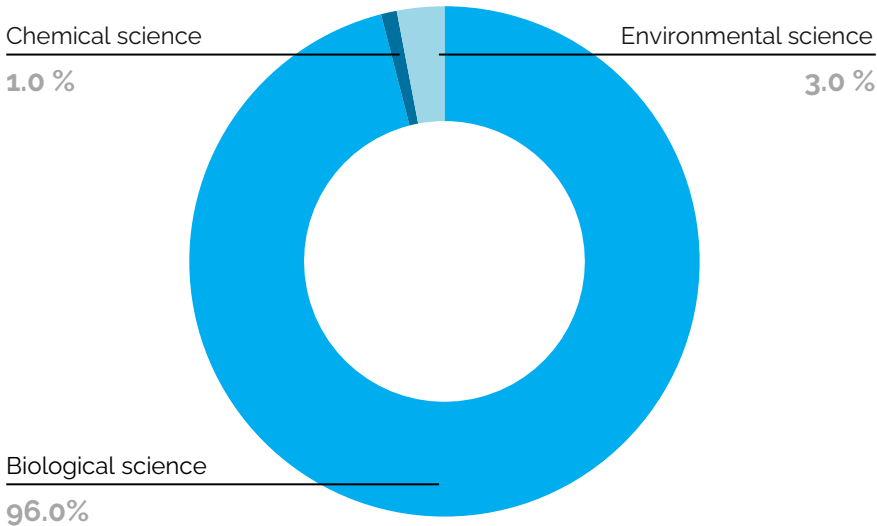


*Fig. 4: The main source of user funding in 2021 came from SME and private companies ('own funding' in the chart), a sharp increase compared to 2020 when this category of funding accounted for 10% of users. This shift can be explained by the relative drop in TNA users compared to 2020 (50.8% of user funding in 2020 vs. 2.7% of user funding in 2021).*

## User scientific domain

The scientific domain of the large majority of users was biological sciences (125 users, 96.0%). Other users (5) came from the environmental and chemical science domains (Fig. 5).

**Fig. 5: User scientific domain in 2021**

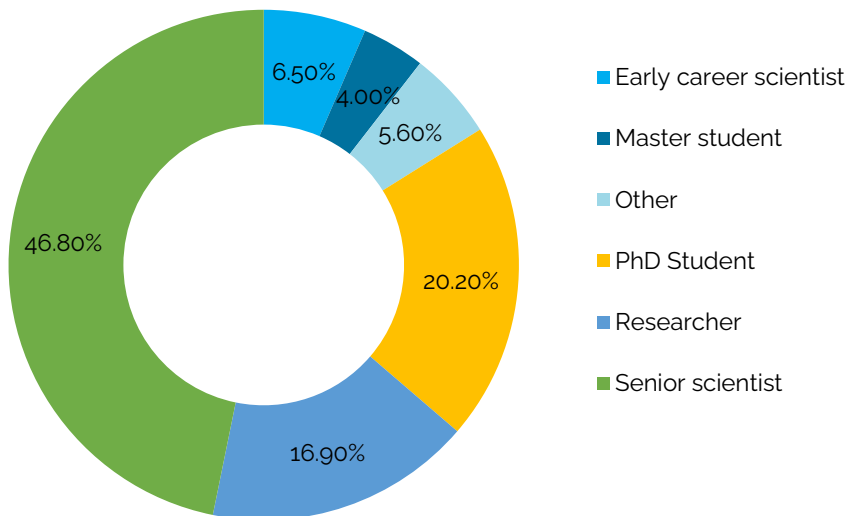


*Fig. 5: Nearly all EMBRC users in 2021 came from the biological sciences, with a very small percentage from chemical and environmental sciences. The total number of users in 2021 was 130.*

## User career stage

Services were provided to researchers at different career stages, predominantly senior scientists, permanent researchers, and PhD students (Fig. 6). Master's students, early career scientists and other types of researchers were much less represented.

**Fig. 6: User career stage in 2021**



*Fig. 6: Nearly half of EMBRC users in 2021 were senior scientists (61 users, 46.8%), with the remainder having a diversity of profiles: Master students (5 users, 4%), PhD students (26 users, 20.2%), early career scientists (9 users, 6.5%) researchers (22 users, 16.9%), other (7 users, 5.6%).*

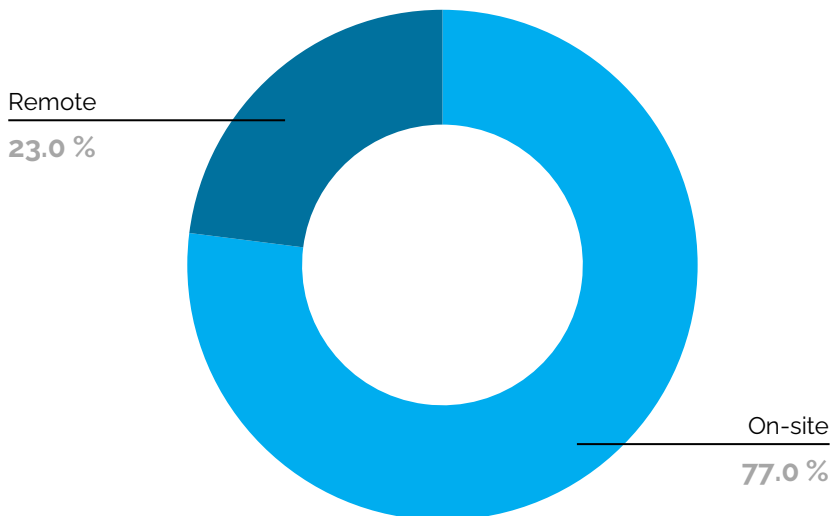
## On-site vs. remote access

As noted above, while many users initially wanted on-site access, they ultimately switched to remote access. This modality of access, not requiring the presence of the users *in-situ* to perform the experiment, was suitable due to COVID restrictions. Remote access accounted for 23% of all services provided in 2021 (up from 12.5% in 2020), representing an increase of almost 100% compared to the previous year (Fig. 7).

We anticipate that this shift, while specific to COVID, may lead to more remote access requests in the future, depending on cost and other factors. However, with remote access comes additional challenges as it requires more availability from our technicians, which is not always feasible.



**Fig. 7: On-site vs. remote users in 2021**



*Fig. 7: In 2021 we saw an increase in the proportion of use of our service by 'remote access' (23% of the overall use of services). Note: services can be used through a combination of on-site and remote access and are calculated accordingly.*

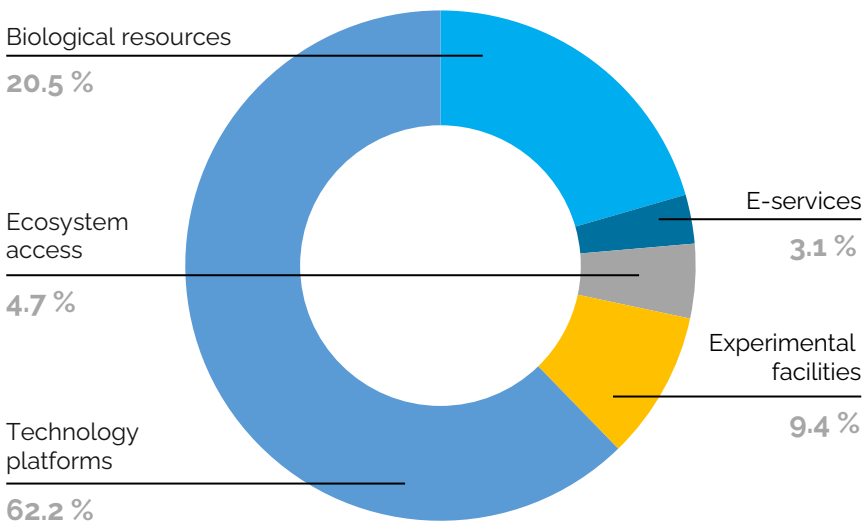


## Type of services used

Users accessed mostly technological platforms (Fig. 8), in particular facilities for structural and chemical analysis, imaging services, taxonomic services and molecular biology laboratories. Other services such as those for the maintenance and rearing of biological resources, experimental facilities and those for ecosystem access were used significantly more compared to previous years. The least-requested service was e-services (3.1%).

Compared to 2020, we can see a net increase in the percentage of users accessing technology platforms (62.2% of users in 2021 vs. 44.7% in 2020); another significant change was the net decrease in researchers using 'ecosystem access' (4.7% of users in 2021 vs. 19% in 2020). These changes can be explained, in part, by the continuing impact of COVID, leading users to alter their experiments and prefer services requiring less time on-site.

**Fig. 8: Type of services used in 2021**



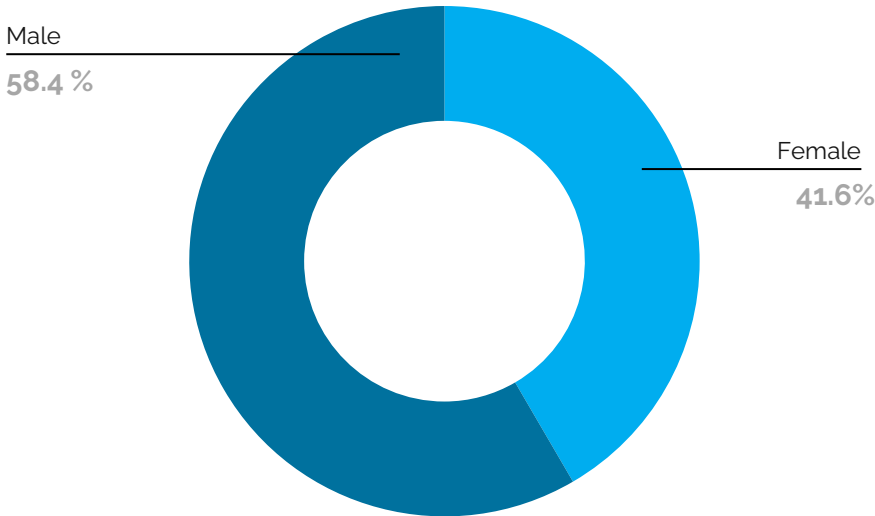
*Fig. 8: Users accessed mostly technological platforms (62.2%) in 2021, particularly facilities for structural and chemical analysis, imaging services, and taxonomic services, as well as molecular biology laboratories. Biological resources were the next most 'popular' service type, representing 20.5% of services used, followed by experimental facilities, ecosystems, and, finally, e-services.*



## Gender balance

Researchers making use of EMBRC services were relatively balanced in terms of gender, with a slight majority of male researchers (M: 76 users, 58.4%, F: 54 users, 41.6%) (Fig. 9). We can thus see a relatively significant decrease in the percentage of female researchers compared to the previous year (54.3% female researchers in 2020).

**Fig. 9: User gender in 2021**

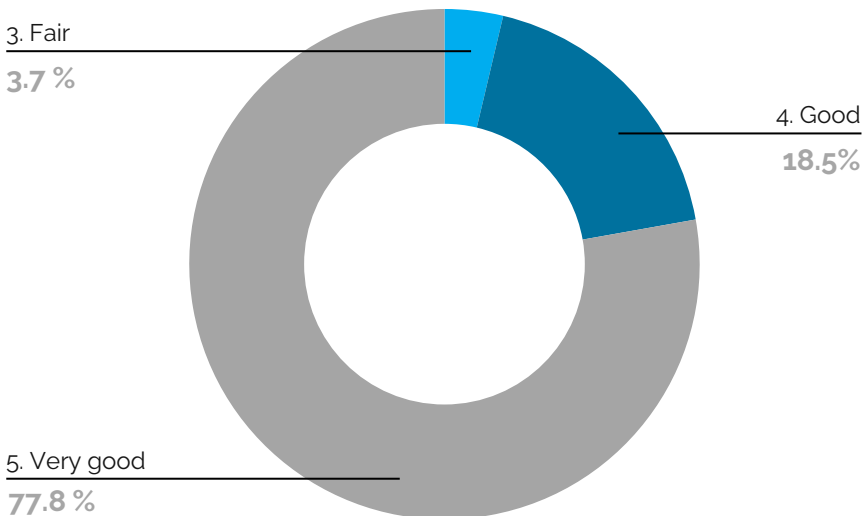


*Fig. 9: EMBRC saw a slight increase in the proportion of male users in 2021 compared to 2020 (58.4% in 2021 vs. 45.7% in 2021).*

## User satisfaction

EMBRC evaluates user satisfaction following service delivery. In 2021, all of the users who answered the feedback survey indicated satisfaction or a high level of satisfaction with EMBRC services (Fig. 10).

**Fig. 10: User satisfaction in 2021**



*Fig. 10: In 2021, EMBRC users indicated satisfaction or a high-level of satisfaction with EMBRC services. This data is derived from a subset of 27 users who answered the feedback survey after the delivery of the requested service(s).*

*Note: only the categories male and female were used in this analysis; it is recognised that there are additional gender categories, which will be incorporated in our assessment in the future, as feasible.*

## User stories

Below you will find a selection of projects that we enabled in 2021.



**Isabel Casal Porras (University of Cadiz, Spain)**

**Evaluation of carbon stocks in the seagrass *Zostera noltei*: antropogenic pressure, contribution to climate change, and economic impact**

*Access provider: Centre of Marine Sciences (CCMAR)*

*Funding: EuroMarine-EMBRC joint call*

'The EuroMarine-EMBRC joint call provided an excellent opportunity to learn new methodologies and techniques at CCMAR. I aim to evaluate the impacts of coastal infrastructures on carbon and nitrogen stocks in seagrass *Zostera noltii* meadows.

CCMAR was an ideal choice for my project "*Carbonoltei*" due to the expertise of the local scientists and for the access to the facilities provided.

Despite carrying out the project during the pandemic, we were able to complete it on time, and a manuscript with the results will be submitted soon, which will be part of my PhD.

I would like to thank the researchers and staff at CCMAR for their support and to make my stay a great experience. I am also grateful for the support offered by the joint call of EMBRC-EuroMarine. I totally recommend researchers to apply for projects in future calls'

**'The EuroMarine-EMBRC joint call provided an excellent opportunity to learn new methodologies and techniques at CCMAR'**





## User stories



**Conrad Helm (University of Göttingen, Germany)**

**Maternal transcriptomic basis of equal vs unequal spiral cleavage in annelids**

*Access provider: Station Biologique de Roscoff (SBR)*

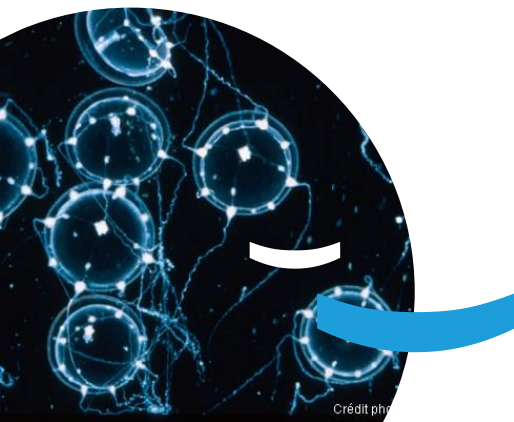
*Funding: ASSEMBLE Plus*

'My research is focused on the evolution of organ systems and developmental processes in invertebrate non-model organisms. I applied to the transnational access programme of ASSEMBLE Plus to search for segmented (annelid) worm species inhabiting the coasts near the *Station Biologique de Roscoff* (SBR) in France.

[EMBRC-coordinated] ASSEMBLE Plus has offered the unique opportunity to get access to all habitats where our organisms of interest occur and to investigate several taxa using a comparative approach.

During my stay at SBR we were able to find and investigate the species *Spinther*, an enigmatic and rarely studied annelid worm living on sponges. This organism will help us to understand the evolutionary background causing the immense variety of body plans in segmented worms. My experience with the people at SBR and all provided services and facilities has been great! Such a support will be decisive for the success of this research project'.

**'ASSEMBLE Plus has offered the unique opportunity to get access to all habitats where our organisms of interest occur...'**



## User stories



**Maria Dolores Belando Torrentes** (*Instituto Español de Oceanografía, Spain*)

**Potential use of putative neutral and adaptive genome data on *Posidonia oceanica* management and conservation**

*Access provider:* Stazione Zoologica Anton Dohrn (SZN)

*Funding:* ASSEMBLE Plus

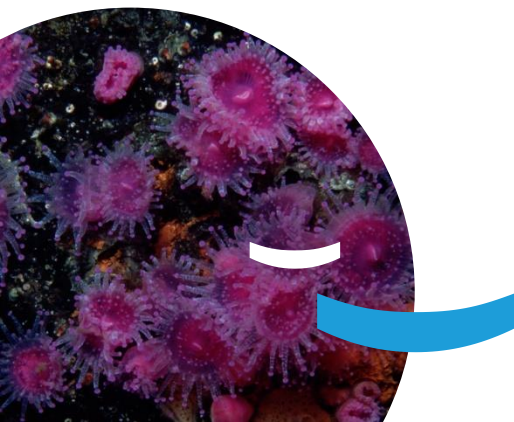
'I applied to ASSEMBLE Plus to have access to the Molecular Biology and Bioinformatics Unit of *Stazione Zoologica Anton Dohrn* (SZN). My research aims at exploring the use of putative neutral and adaptive genomic markers for identifying *Posidonia oceanica* meadows for conservation prioritization in a region of the western Mediterranean.

The ecological and functioning status of a relict *P. oceanica* meadow from a historically contaminated area (SE of Spain) has been assessed by integrating physiological / biochemical, landscape and mapping data within the frame of the "UMBRAL" project in the *Instituto Español de Oceanografía* (*Centro Oceanográfico de Murcia*).

The ASSEMBLE Plus grant provided the opportunity to integrate the genetic level in this approach, and will allow us to understand the role that populations may have in the conservation of this species in the face of future environmental changes.

During my stay at SZN I received wonderful hospitality, high technical and logistical help by the administrative and scientific staff, in a nice friendly environment. We are currently working together with the laboratory of Dr. Procaccini (SZN) to analyse and publish our discoveries.'

**'During my stay at SZN I received wonderful hospitality, high technical and logistical help...'**



## User stories



**Ivana Bušelić Garber (Croatian Institute of Oceanography and Fisheries, IZOR, Croatia)**

**Transcriptomic approach to environmentally friendly farming of European sea bass in the Adriatic Sea, using alternative protein sources**

*Access provider: Institute of Marine Biology, Biotechnology and Aquaculture (HCMR-IMBBC)*

*Funding: EuroMarine-EMBRC joint call*

'I applied to the EuroMarine-EMBRC joint call at the beginning of my post-doctoral contract to acquire skills in the area of advanced data analysis and bioinformatics. For the present study, three newly designed and tested diet formulations were selected for a comprehensive analysis of transcriptomic profiles of sub-adult European sea bass intestines after performed feeding trial at a laboratory scale.

The access to HCMR-IMBBC has been a very valuable experience, as I worked under the guidance of Dr. Elena Sarropoulou and her team. I believe that communication was key to performing this study remotely in times of the COVID-19 pandemic. The results obtained in my experiments were presented at the Aquaculture Europe 2021 meeting in Madeira. I am working on a joint manuscript with the researchers at HCMR-IMBBC describing the benefits of using alternative protein sources in European sea bass aquaculture. Hopefully, this is only a beginning of a very fruitful collaboration'.

*\*Pictured: Ivana Bušelić Garber during a fish feeding experiment.*

**'The access to HCMR-IMBBC has been a very valuable experience'**



## User stories



**Peter von Dassow (Pontificia Universidad Catolica de Chile, Chile)**  
**Identification of *Pseudo-nitzschia* strains from the Southeast Pacific (Chilean coastal and offshore waters)**

*Access provider:* Stazione Zoologica Anton Dohrn (SZN)

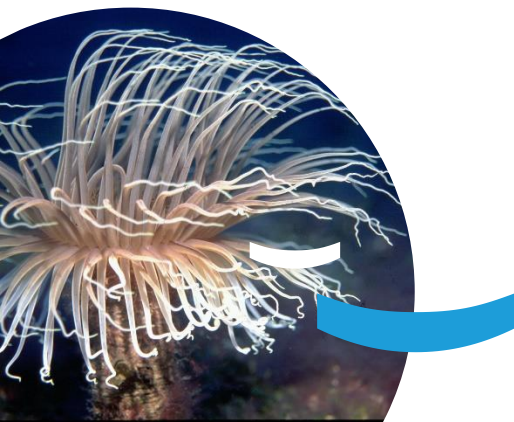
*Funding:* ASSEMBLE Plus

'I applied to ASSEMBLE Plus to come to the *Stazione Zoologica Anton Dohrn* in Italy to identify species of the diatom *Pseudo-nitzschia* in a collection of over 127 strains isolated in coastal and oceanic waters of Chile. This important genus of diatoms is present all over the world, and is of practical interest as about half of the species are toxic. However, the taxonomy and phylogeny of *Pseudo-nitzschia* is very challenging, and it has been little studied in the Southeast Pacific.

The grant allowed me to learn from the deep expertise in this genus that is found among the researchers of the SZN, and specifically I could access the Marine Organism Taxonomy (MOTax) service. I found many species of *Pseudo-nitzschia*, most identified for the first time in the Southeast Pacific.

This opportunity was essential for completing this work and the results will be fundamental for further biological oceanographic and ecological research on the genus in those waters'.

**'The grant allowed me to learn from the deep expertise in this genus that is found among the researchers of the SZN'**



## Service developments



**Ioulia Santi**

**Observation, Data and  
Service Development Officer**



**Nicolas Pade**

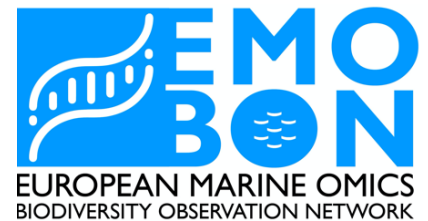
**Executive Director**

EMBRC strives to develop its service offer and to ensure that it is scientifically pertinent, and this continued to be the case in 2021. In accordance with the EMBRC Science Strategy, we launched a pilot 'omics observatory' (European Marine Omics Biodiversity Observation Network, EMO BON) and continued to work on the development of a bioprospecting service.

### European Marine Omics Biodiversity Observation Network (EMO BON)

Marine biodiversity is of increasing concern nowadays. As an important component of the marine ecosystem, it is greatly affected by stressors such as climate change and marine

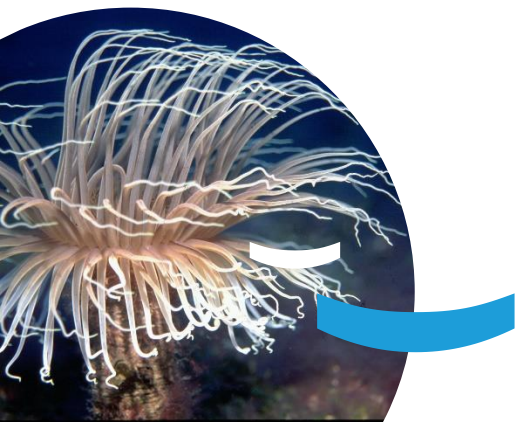
pollution and eutrophication. There are many recent initiatives aiming to restore ocean health and to protect the ecosystems (European Green Deal, United Nations Decade of Ocean Science for Sustainable Development, Biodiversity Strategy for 2030), however, there is a lack of long-term marine biological monitoring data to support them. In contrast to the structured and standardised data production in physical and chemical ocean observation, biological observation data are typically scattered across various short-term initiatives. As such, it a challenge to turn the data into information and action.





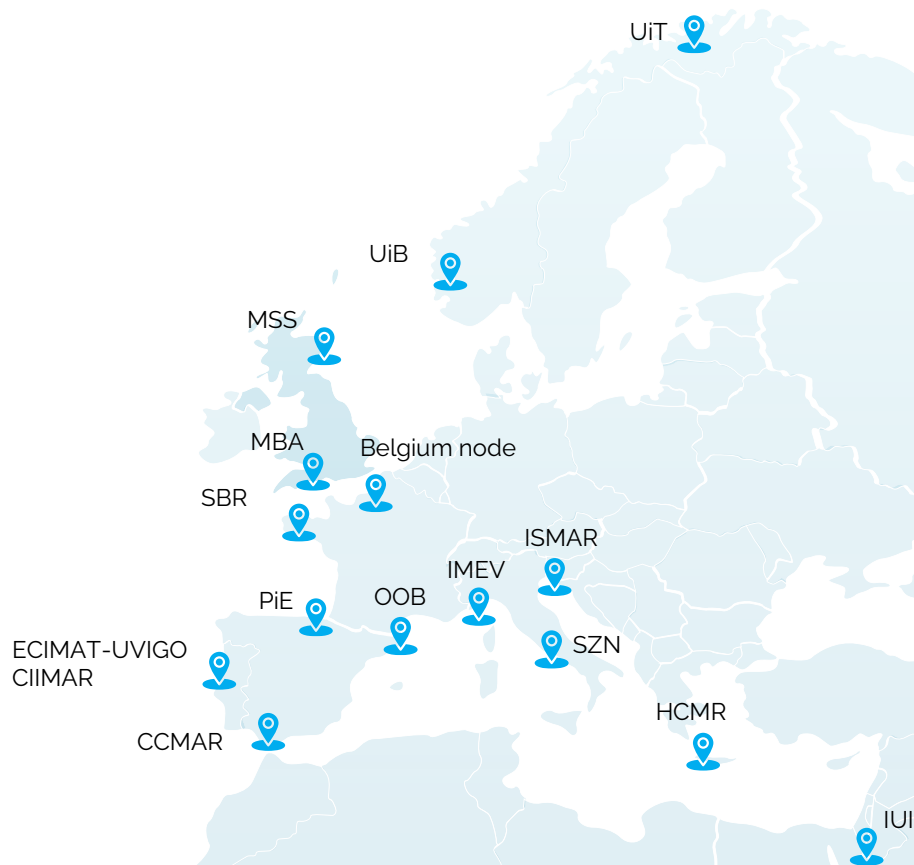
To fill this gap, in 2021, EMBRC launched the European Marine Omics Biodiversity Observation Network (EMO BON), with the aim to establish the first centrally coordinated, long-term, genomic biodiversity observatory in Europe. While there are many individual biological observation stations in Europe, there are few and inconsistent links among them. EMBRC unites these efforts amongst its partner institutions under one centrally organised network that uses shared protocols, international standards and agreed policies.

EMO BON draws on the vast experience and knowledge of individual EMBRC stations, while expanding it to include omics methodologies, open protocols, and systematic production of FAIR (Findable, Accessible, Interoperable, Reusable) data. EMO BON plans to become the European component of global genomic observation by engaging with international entities such as the Group on Earth Observations Biodiversity Observation Network (GEO BON) and the GLOMICON (Global Omics Observatory Network).



## EMO BON participants

EMO BON includes 16 marine biodiversity observatory stations across the EMBRC network. Three different marine habitats are sampled at fixed, frequent time intervals: the water column, the soft substrates, and the hard substrates. Samples are collected to access the biodiversity of microorganisms, meio- and macro-fauna following the Standard Operational Procedures (SOPs) described in the EMO BON Handbook. The SOPs in the EMO BON Handbook were developed in consultation with a working group composed of genomic observatory operators, and built on existing initiatives, such as the ARMS MBON (Autonomous Reef Monitoring Structures Marine Biodiversity Observation Network).



## Meet the EMO BON participants

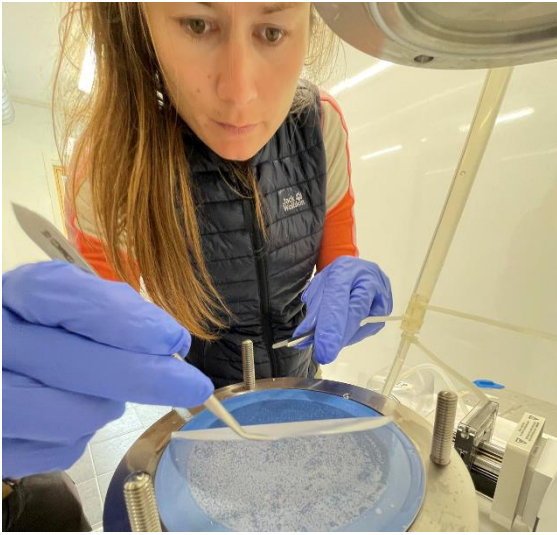
EMO BON operator acronym	EMO BON operator	Marine region	Climate zone	Ecosystem	Coordinates	Sampling scheme
<b>BELGIUM</b> 						
<b>VLIZ</b>	Flanders Marine Institute	North Atlantic Ocean (North Sea)	Temperate	Coastal marine ecosystem	51.4 N 2.8 E	Water column, soft & hard substrates
<b>KULeuven</b>	Katholieke Universiteit Leuven				(same as above) <sup>5</sup>	
<b>RBINS</b>	Royal Belgian Institute of Natural Sciences				(same as above)	
<b>UGent</b>	Ghent University				(same as above)	
<b>FRANCE</b> 						
<b>IMEV</b>	<i>Institut de la Mer de Villefranche</i>	Mediterranean Sea (Western Basin, Villefranche Bay)	Temperate (Mediterranean)	Coastal marine ecosystem	43.7 N 7.3 E	Water column, hard substrates
<b>OOB</b>	<i>Observatoire Océanologique de Banyuls-sur-Mer</i>	Mediterranean Sea (Western Basin, Gulf of Lion)	Temperate (Mediterranean)	Coastal marine ecosystem	42.5 N 3.1 E	Soft substrates
<b>SBR</b>	<i>Station Biologique de Roscoff</i>	North Atlantic Ocean (English Channel)	Temperate	Coastal marine ecosystem	48.8 N 3.9 W	Water column, soft & hard substrates
<b>GREECE</b> 						
<b>HCMR</b>	Institute of Marine Biology, Biotechnology and Aquaculture, Hellenic Centre for Marine Research	Mediterranean Sea (Eastern Basin, Aegean Sea)	Temperate (Mediterranean)	Coastal marine ecosystem	35.3 N 25.3 E	Water column, soft & hard substrates
<b>ISRAEL</b> 						
<b>IUI</b>	Interuniversity Institute for Marine Sciences	Indian Ocean (Gulf of Eilat)	Dry	Coastal marine ecosystem	29.5 N 34.9 E	Water column & hard substrates

5. KULeuven, RBINS, and Ugent are participating in EMO BON together with VLIZ (as the Belgian node); there is a single sampling site for all four partners (see information in the row for VLIZ).



EMO BON operator acronym	EMO BON operator	Marine region	Climate zone	Ecosystem	Coordinates	Sampling scheme
<b>ITALY</b> 						
<b>CNR-ISMAR</b>	<i>Consiglio Nazionale delle Ricerche</i>	Mediterranean Sea (Eastern Basin, Adriatic Sea)	Temperate (Mediterranean)	Coastal marine ecosystem	45.3 N 12.5 E	Water column, hard substrates
<b>SZN</b>	<i>Stazione Zoologica Anton Dohrn</i>	Mediterranean Sea (Western Basin, Tyrrhenian Sea)	Temperate (Mediterranean)	Coastal marine ecosystem	40.8 N 14.2 E	Water column, soft Substrates
<b>NORWAY</b> 						
<b>UIB</b>	University of Bergen	North Atlantic Ocean (North Sea)	Polar	Coastal marine ecosystem (fjord)	60.4 N 5.3 E	Water column
<b>UIT</b>	The Arctic University of Norway	Arctic Ocean (Norwegian Sea)	Polar	Coastal marine ecosystem	68.9 N 17.1 E	Water column
<b>PORTUGAL</b> 						
<b>CCMAR</b>	Centre of Marine Sciences	North Atlantic Ocean (Ria Formosa)	Temperate	Coastal marine ecosystem (lagoon)	37.0 N 7.9 W	Water column, soft substrates
<b>CIIMAR</b>	Interdisciplinary Centre of Marine and Environmental Research	North Atlantic Ocean (Porto Valley)	Temperate	Coastal marine ecosystem (estuarine)	41.1 N 8.7 W	Water column
<b>SPAIN</b> 						
<b>UPV/EHU</b>	Plentzia Marine Station	North Atlantic Ocean (Bay of Biscay)	Temperate	Coastal Marine ecosystem (estuarine)	43.3 N 3.0 W	Water column & hard substrates
<b>UVIGO</b>	Toralla Marine Science Station - Vigo University Marine Research Centre	North Atlantic Ocean (Vigo Seamount)	Temperate	Coastal marine ecosystem	42.2 N 8.8 W	Water column, soft & hard substrates
<b>UNITED KINGDOM</b> 						
<b>MBA</b>	The Marine Biological Association	North Atlantic Ocean (English Channel)	Temperate	Coastal marine ecosystem	50.2 N 4.2 W	Water column
<b>MSS</b>	Scottish Government - Marine Scotland Science	North Atlantic Ocean (North Sea)	Temperate	Coastal marine ecosystem	56.9 N 2.1 W	Water column, soft substrates

## Analysis and data



*First sampling at the northernmost EMO BON station (Norway). © Kim Praebel*

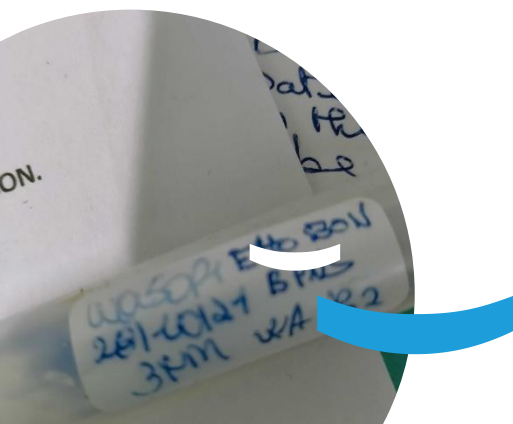
DNA extraction and sequencing is performed at a centralised facility using the same methodologies for all samples, thus reducing biases, and ensuring consistency in the high-quality of sequencing. The genomic data generated follow the FAIR data principles and are released as citable data publications at regular intervals. The data are accompanied by rich metadata including detailed information on the provenance and complementary data including many Essential Ocean Variables (EOVs). Examples of these metadata include information about the place and date of sampling, the people involved, the methods followed, and the preservation of samples.

Data publications will announce the release of the (meta)data and will describe their location and accessibility.

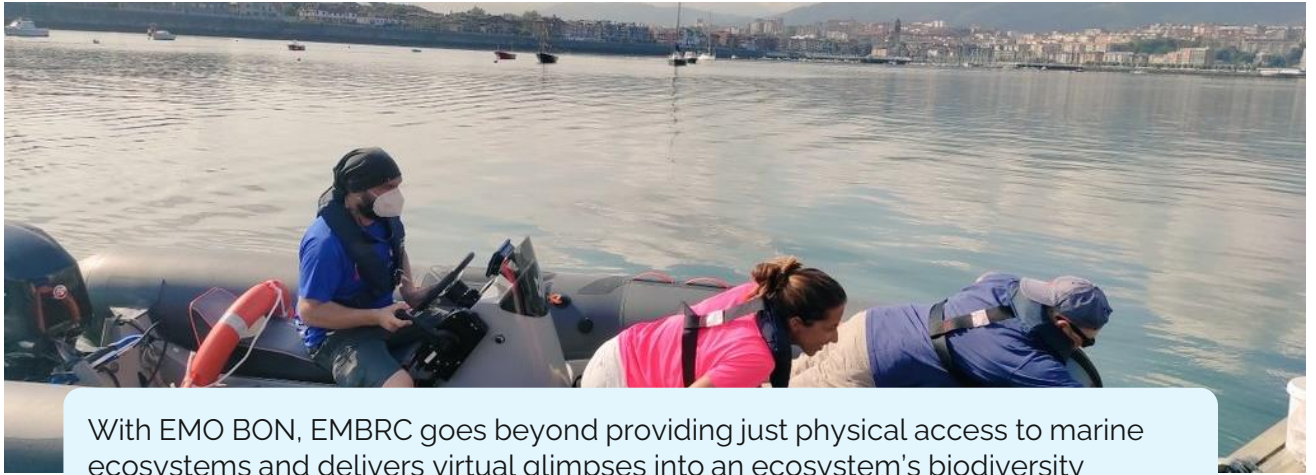
The generated genomic data can reveal the biodiversity of different communities from microorganisms to Metazoa, their temporal trends and shifts, the ecological relationships among species, and their responses to environmental changes. The data and information produced can therefore support several different research fields: biodiversity, environmental change, microbiome, bioprospecting and biotechnology, new and invasive species detection and biological modelling.



*Microm filter, Getxo marina, PIE UPVEHU. © Ibon Cancio*



## EMO BON: a new paradigm



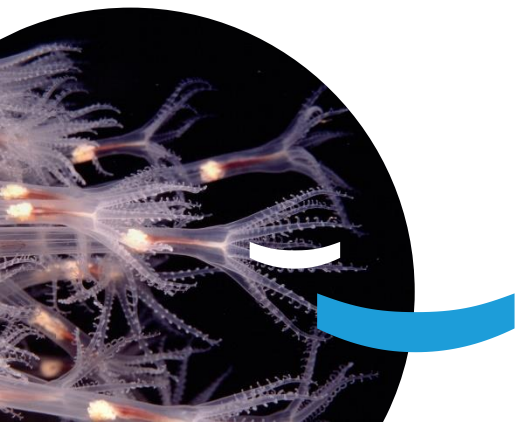
With EMO BON, EMBRC goes beyond providing just physical access to marine ecosystems and delivers virtual glimpses into an ecosystem's biodiversity through data. EMO BON sets very high standards in terms of scientific methodologies, data management workflows, and relevant ethical and legal procedures, while keeping all its procedures openly available.

As such, EMO BON will become a paradigm to follow and inspire other initiatives. EMO BON was created to reflect the need for structured data collection and provision in marine biology and, therefore, will support the knowledge-based, sustainable management of marine ecosystems.

*Sampling in action, PIE UPVEHU. © Ibon Cancio*

## EMO BON Operational Committee

EMO BON's governing body is the Operational Committee (OpCo). The OpCo meets regularly to discuss key points on the development of EMO BON, oversees its function and decides on operations.



## EMO BON in numbers (2021):



**9**

participating countries



**19**

partner institutions



**16**

registered  
observatory stations



**4**

water column  
sampling campaigns  
(June, Aug, Oct, Dec)



**2**

projects in which EMO  
BON participated  
(EOSC-Life, Horizon)



**1**

shipment of samples  
for analyses



**1**

EMO BON Handbook published in the  
Ocean Best Practices System



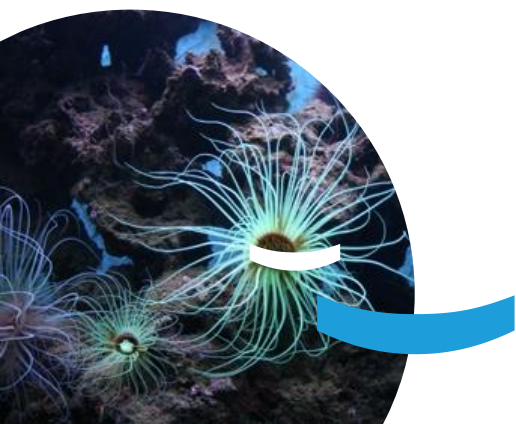
**4**

soft substrate sampling campaigns:  
microorganisms (June, Aug, Oct, Dec),  
*meiobenthos* (June, Oct) and  
macrobenthos (Oct)



**2**

events: Organised the 'Coordinating genomic sampling across a European Infrastructure' session at 'The 5th Community Workshop of the IOC-UNESCO Ocean Best Practices System: An Ocean of Values'; participated in the Biodiversity Genomics 2021: sequencing genomes across the planet conference



## Bioprospecting

EMBRC started work to develop a bioprospecting service, a so called 'pipeline', integrating the capabilities, platforms, and expertise available in EMBRC nodes in a set of services supporting the entirety of a bioprospecting workflow.

## Developing capacity in projects

Having completed the inventory of capabilities in 2020, and identified the priorities to focus on, in 2021, the focus was on identifying opportunities to develop various aspects of our bioprospecting capabilities through projects. Consequently, a significant effort was placed on proposal writing to a) obtain funds to develop the pipeline and b) to demonstrate the value of these capabilities. However, it proved to be a significant challenge to successfully convince project consortia to include marine components, for example in health-related topics, as they are unfamiliar with the potential that can come from marine biological resources. Consequently, we had to be much less ambitious than we had aspired to be, but nonetheless, we hope for a positive evaluation of our projects and to work on these aspects in the larger context of cancer and infectious diseases.

## Collaborative endeavours

In 2021, we worked closely with EU-OPENSREEN (see Partnerships section) to brainstorm on how to successfully link EMBRC activities to their compound libraries. EU-OPENSREEN recognises the huge potential of novel compounds coming from marine organisms, and although several bottlenecks have been identified, there is shared enthusiasm for developing solutions to overcome these. A number of funding opportunities were identified for 2022 where we can work together to solve these technical limitations.

Finally, we had a first opportunity to test two of EMBRC's bioprospecting capabilities in the context of the kick-starter grants in the H2020 RI-VIS project. EMBRC linked with the Institute for Microbial Biotechnology and Metagenomics (IMBM) at the University of Western Cape in South Africa to support their bioprospecting efforts.



## Snapshot: RI-VIS kick-start award, interaction between EMBRC and IMBM (South Africa)

An iterative process between partners, and close communication between IMBM and EMBRC's nodes maximized project progress. Decision points were established during project development, and corrective measures or interventions were rapidly deployed as needed.

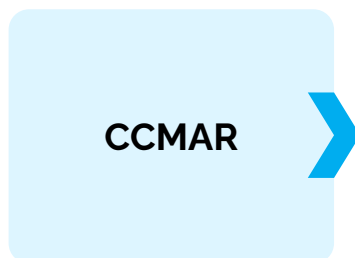
Extensive biological resources, >3900 bacterial isolates from South Africa

(<http://imbm.co.za/>)



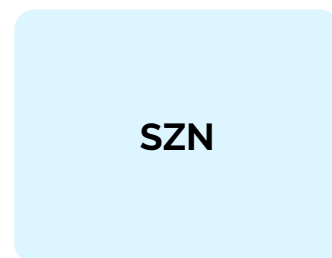
EMBRC.PT Chemistry Platform

(<https://www.ccmар.ualg.pt>)



EMBRC.IT Bioscreening Platform

(<http://www.szn.it>)



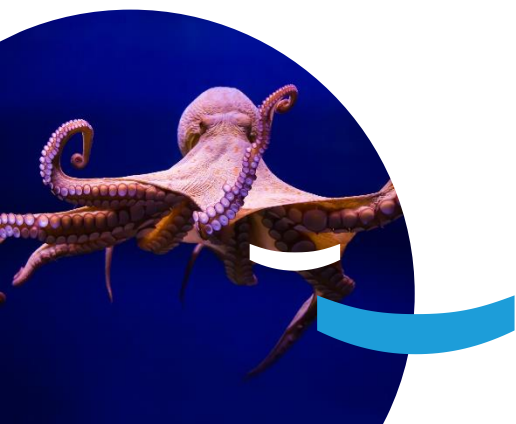
**Institute for Microbial Biotechnology and Metagenomics (IMBM), University of the Western Cape.**

### Dereplication

Chemical Screen → Novel compounds → Bioassay → Not novel



Our Portuguese and Italian nodes were mobilised to provide chemical characterisation of extract and anti-microbial screening of an extract from an indigenous microorganism. Unfortunately, a problem in the production of the extract meant that only limited quantities could be shipped to EMBRC, excluding the possibility of screening. Nonetheless, the service provided to IMBM was deemed highly useful and with high-quality results.



# Access and benefit-sharing (ABS)

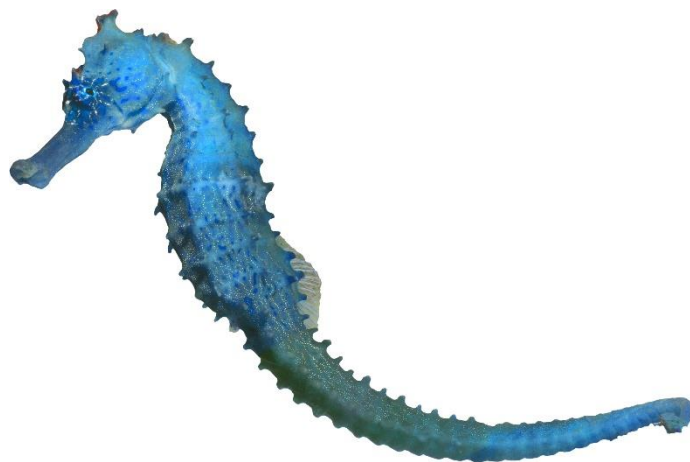


**Anne Emmanuelle Kervella**  
International Cooperation  
Officer



**Arnaud Laroquette**  
Access and Benefit Sharing  
(ABS) Compliance Officer

With the deployment of the international tracking mechanism adopted by the Nagoya Protocol, the issue of accessing and using marine genetic resources has become a concern for EMBRC. An Access and benefit-sharing (ABS) Working Group was set up in spring 2019 to assess the current situation and anticipate new developments. ABS has also been addressed in projects involving EMBRC such as the Interreg project EBB, as well as ASSEMBLE Plus and EOSC-Life.



# EMBRC guides on ABS

Ensuring compliance within EMBRC, especially in the collections and biobanks, has been a focus area. In March 2021, EMBRC published a set of ABS best practices within the framework of EBB: **'The EMBRC guide to ABS compliance: Recommendations to marine biological resources collections' and users' institutions'**. This document aims to help EMBRC nodes and their operators to learn about and incorporate the new, complex international framework adopted by the Nagoya Protocol, which has been implemented in the EU since 2014. The handbook focuses on organising collections' movement of resources and harmonising identification (resource passport) and documentation archiving practices. The global handbook was completed by a 6-step guide to help users comply: **'Seek, keep & transfer: A step-by-step guide to ABS compliance when utilizing marine genetic resources'**.

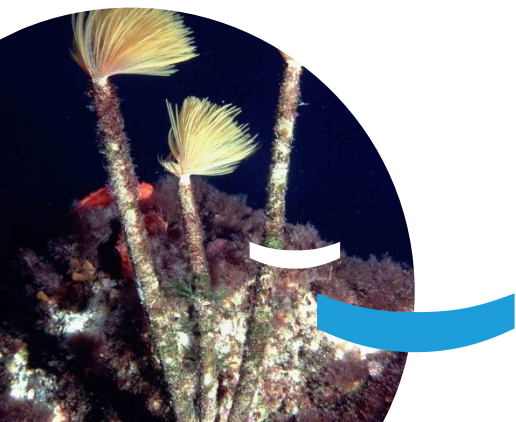
The ABS guides were presented in 2021 via different fora (ASSEMBLE Plus 2021 Conference, EBB Final Event) and disseminated within EMBRC via its nodes. In addition, a webpage was created on the EMBRC website to explain the ABS framework and highlight the guides. In addition, training webinars, based on the guides, are now in development.

## Implementation of ABS best practices

The implementation of ABS best practices started with EMBRC collections in autumn 2021. The aim was to develop a system for compliant and simplified access and use of genetic resources. Moreover, the EBB project assessed compliance with the national ABS legislation of its participating collections (including some EMBRC collections). This audit was extended in 2021 to all EMBRC collections as well. We compared the origin of resources held by these collections with the ABS legal framework of each country of origin of the biological resources to evaluate compliance. Based on this assessment, we expect that in 2022, collections and applicants of resources will know the status of each stored resource with regards to ABS and be informed of the necessary steps to undertake before accessing and using the resources in their projects

In parallel, the aforementioned handbook ('The EMBRC guide to ABS compliance...') will be updated in 2022 to decide how EMBRC services will address ABS compliance of its users. Once this is adopted, EMBRC will apply for its best practices guidelines to be recognised in the European Commission Register of ABS Best Practices.

<sup>6</sup>ABS refers to the way in which biological resources may be accessed, and how the benefits that result from their utilisation in research and development are shared with the country of origin. Since the date of entry into force of the Nagoya Protocol (NP), users of biological resources have the obligation to comply with ABS requirements when obtaining samples from countries that have ratified the NP and adopted 'access legislation'





# Contribution to international debates on access to marine resources and 'DSI'

Throughout 2021, EMBRC followed and contributed to the debate about access to marine resources in the high seas, which is being negotiated in the framework of the high seas governance UN treaty, and digital sequence information (DSI) from genetic resources in the Convention on Biological Diversity. In this regard, EMBRC published a position statement in October 2021 in the context of the COP15 of the Convention of Biological Diversity supporting the DSI Scientific Network call for an open access to sequence data: **'Sharing the benefits arising from the use of Digital Sequence Information on genetic resources: EMBRC supports the DSI Scientific Network call for a decoupled and multilateral solution respectful of the Open Science policies and scientific practices'**

## ABS, sample permits, Open Science system, FAIRification

With the establishment of the genomic observatory EMO BON and in the framework of the EOSC-Life project, it became apparent in 2021 that holistic solutions are needed to address ABS and related issues. Traditionally, ABS and authorisations to sample, for example, have been treated as separate topics. Now, we want to deal with these issues, and other related issues (eg Open Science system and FAIRification of data) simultaneously. EMBRC thus expanded its ABS WG in 2021 to include collections managers and e-Infra experts, with the objective to formulate specifications for a traceability system from sampling to data.

Building a traceability standard for projects, sampling campaigns, collections, and services, based on scientific needs and FAIR principles, and consistently identifying the geographical origin of the genetic resources and the rights attached to them, emerged as priorities for EMBRC. Aside from being a service to the community, these developments could help contribute to building trust between countries providing access to bioresources under their sovereign rights. This, in turn, is expected to lead to constructive discussions and simplified mechanisms for public scientific research, which has been undermined since the Nagoya Protocol as evidenced by the debate on DSI.

7 Fifteenth meeting of the Conference of the Parties



# ABS contribution to projects and topics in 2021: highlights

<b>ABS in collections</b>	<ul style="list-style-type: none"> <li>• Analysis of the origin of biological resources in EMBRC collections, and study of the providers countries' ABS measures. Results will be shared with collections in 2022.</li> <li>• Groundwork laid to start implementing EMBRC recommendations in 2022</li> </ul>
<b>DSI</b>	<ul style="list-style-type: none"> <li>• Participation in the CBD COP15 preparation meetings and technical webinars on DSI</li> </ul> <p><b>May 2021</b></p> <ul style="list-style-type: none"> <li>• Closed workshop "DSI and the CBD - position paper from the European scientific community"</li> </ul> <p><b>July 2021</b></p> <ul style="list-style-type: none"> <li>• DSI Webinar Latin America</li> <li>• Signature of the petition from scientists and collections in Europe: 'Keep Digital Sequence Information a common good'</li> </ul> <p><b>Oct 2021</b></p> <ul style="list-style-type: none"> <li>• Position statement: 'Sharing the benefits arising from the use of Digital Sequence Information on genetic resources: EMBRC supports the DSI Scientific Network call for a decoupled and multilateral solution respectful of the Open Science policies and scientific practices'</li> </ul>
<b>EBB</b>	<p><b>Jan 2021</b></p> <ul style="list-style-type: none"> <li>• Report WP5. Compliance for collections and fundamental research using marine biological resources. (25/1/21)</li> </ul> <p><b>Jan to Feb 2021</b></p> <ul style="list-style-type: none"> <li>• Review and publication on EMBRC website of the 'Seek, Keep and Transfer guide: a step-by-step guide to ABS compliance when utilizing genetic resources' (D3.4)</li> </ul> <p><b>Mar 2021</b></p> <ul style="list-style-type: none"> <li>• Review of the report on use cases (D6.2); review of the report on application and EBB's contribution to Best Practice Guidelines (3/18/21)</li> <li>• Symposium (EBB closing event) (23/3/21)</li> <li>• Publication on EMBRC website of the EMBRC guide for ABS compliance: 'Recommendation marine biological resource collections' and users' institutions'</li> </ul> <p><b>Apr to July 2021</b></p> <ul style="list-style-type: none"> <li>• Review of the 6 Training Webinars on ABS (WP5)</li> </ul>
<b>EMO BON</b>	<ul style="list-style-type: none"> <li>• Contribution to sampling and ABS permits monitoring</li> </ul> <p><b>Jun 2021</b></p> <ul style="list-style-type: none"> <li>• EMO BON Operational Committee: Presentation of ABS requirement impact on EMO BON (17/6/21)</li> </ul> <p><b>July 2021</b></p> <ul style="list-style-type: none"> <li>• Models for Material Transfer Agreements to provide conditions for exchanging biological resources and data between EMBRC and a service provider (Genoscope)</li> </ul>
<b>EOSC-Life</b>	<ul style="list-style-type: none"> <li>• WP4.1 Document on the minimum provenance data required for databases: 'FAIR data management: Provenance and Nagoya Protocol'</li> </ul> <p><b>Oct 2021</b></p> <ul style="list-style-type: none"> <li>• WP4. Participation in testing the toolbox : Categorisation system. Publication on 06/10/2021: <a href="#">EOSC-Life WP4 Toolbox: Update of the categorisation system (version 3)   Zenodo</a></li> <li>• WP6.4 Development of a model of provenance that is related to non-clinical biological data</li> <li>• WP6.4 Survey of EMBRC stations to get feedback on their provenance management</li> </ul>
<b>Other projects &amp; events</b>	<p><b>Jan 2021</b></p> <ul style="list-style-type: none"> <li>• ABS ASSEMBLE Plus conference: Organisation and contribution to the 'How to do Nagoya event (70 attendees) (29/01/21)</li> </ul> <p><b>Jun 2021</b></p> <ul style="list-style-type: none"> <li>• Co-organisation and contribution to the EU ABS Facilitators Network Event (14/6/21)</li> </ul> <p><b>Dec 2021</b></p> <ul style="list-style-type: none"> <li>• AtlantECO: Presentation of ABS management in projects (15/12/21)</li> </ul>

# Training: Supporting the next generation of marine biologists



**Tim Deprez**

**Marine Training Coordinator**

## Marine Training Network and IMBRSea

EMBRC facilitates access to marine-related research opportunities and supports the education of next generation of marine biologists. This is achieved through two initiatives:

**The Marine Training Network** – A web-based platform developed by EMBRC to offer an overview of current marine and maritime education opportunities, while providing a supporting framework to foster new training initiatives and exchange best practices. It aims to train the next generation of 'blue workers' and re-train the current generation, and provide answers to trainees in search of training and trainers looking for support (eg on how to organise training initiatives).

**The IMBRSea Masters Programme** - The International Master in Marine Biological Resources (IMBRSea), is a joint Master programme organised by eight leading European universities in the field of marine sciences; Ghent University (BE), Sorbonne University (FR), University of the Algarve (PT), University of Oviedo (ES), Galway-Mayo Institute of Technology (IE), University of the Basque Country (ES), Polytechnic University of Marche (IT), and University of Bergen (NO), University of Western Brittany - UBO (FR) and University of Gothenburg - UGOT (SE), supported by 14 EMBRC operators.

## 2021 training programme highlights

2021 saw major progress for both the Marine Training Network and IMBRSea, which are managed by the same team based at UGhent.

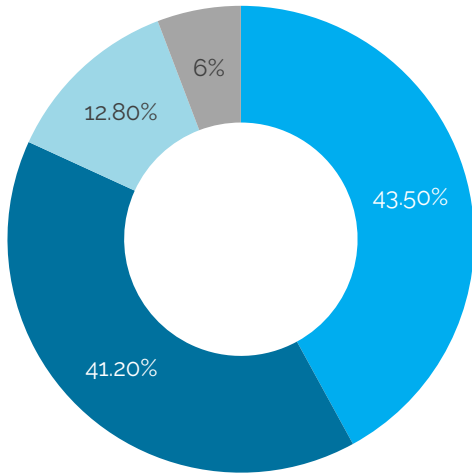
- The Marine Training platform further invested in digital and blended training with involvement, for example, in a new digital training centre at the UGent campus in Ostend and two new projects: DOORS (Developing an Optimal and Open Research Support) and OceanTraining.eu (toolbox for digital ocean education)
- In September 2021, 117 new students started the IMBRSea programme

Due to the pandemic, most planned workshops could not take place, and furthermore, the IMBRSea summer school could not take place in Sweden.

# Learning opportunities in MarineTraining.eu in 2021

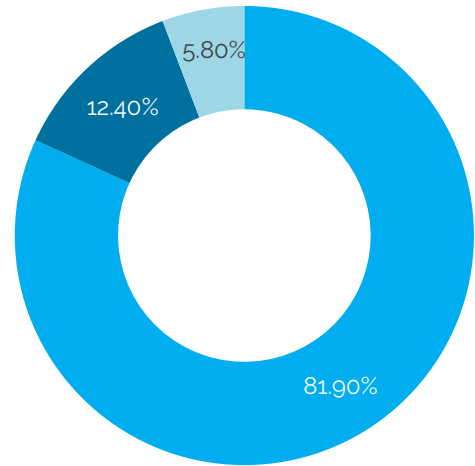
Programmes **3,077**

■ Bachelor ■ Master ■ Phd ■ Short cycle



Courses **518**

■ Onsite ■ Online ■ Blended



**82**

Countries



**40**

Languages



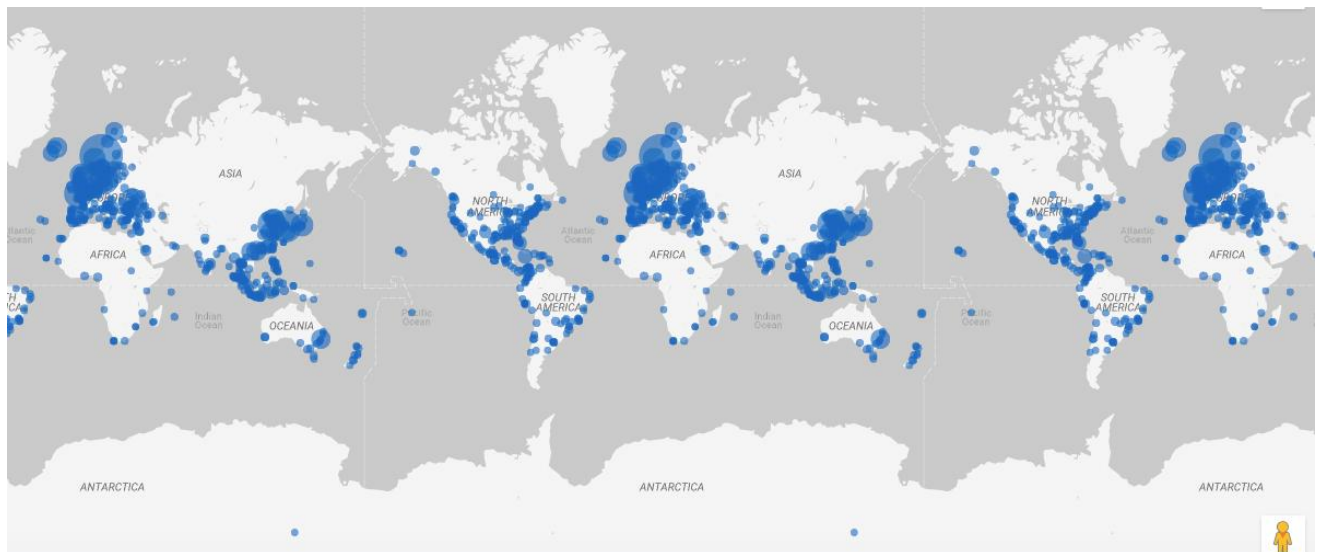
**830**

Providers



**102**

Authors



# Virtual tours



## Pilot tour at CCMAR

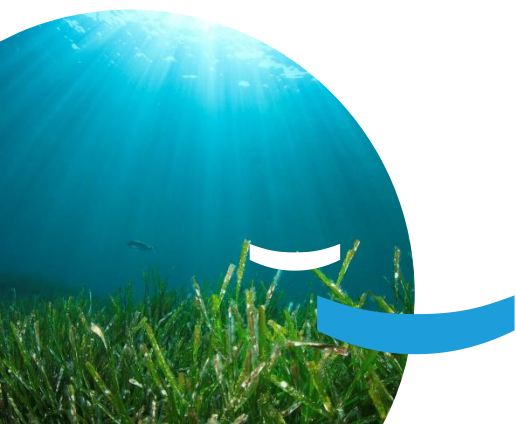
Under the umbrella of EMBRC training activities, extensive work was undertaken in 2021 on the development of virtual tours of EMBRC facilities. The aim of these tours is to simulate an in-person tour of research facilities and equipment.

The first immersive virtual tour was filmed at EMBRC-PT partner CCMAR in 2021. For this purpose, UGent sent an intern (PhD student Mario Gaitan) to CCMAR to film facilities using a 3D camera. The 'staging' for the filming and subsequent captioning of the images was done in collaboration with the EMBRC-PT Communications Manager, Rita Costa Abecasis.

The CCMAR virtual tour will be incorporated into the EMBRC service catalogue in 2022, with links to relevant footage being added to individual service descriptions. As such, users will easily be able to view the CCMAR facilities before applying to use them via the EMBRC service catalogue. This decision was made in collaboration with the EMBRC Access Officer and Communications Officer.

## Scaling up in 2022 and beyond

Mario and Rita also developed a guideline document ('Virtual tours guidelines and standards') in 2021 to help other EMBRC facilities develop similar tours in the future. It is hoped that the guidelines will serve, in effect, as a roadmap for the scaling up of the virtual tours in 2022, and that several additional tours will be produced at other EMBRC marine stations. In addition, Mario will capture footage for EMBRC-BE partners in 2022.





# Projects



**Sidonie Gras**

**Scientific Officer & Project Manager**

## Overview

In addition to providing services, EMBRC is actively involved in numerous European and international projects, supporting research and coordinating activities. Diverse in scope and country involvement, these projects aim to enhance EMBRC activities and/or services, strengthen collaboration with similar European organisations ('research infrastructures', RIs), structure the research community, provide services to support research, and support innovative science through Trans-national Access (TA) programmes.

Projects provide opportunities to develop joint services, tools and activities, as well as to enhance knowledge-sharing in view of optimising research in Europe and beyond. They also provide an opportunity to develop strong relationships with participating institutions as well as networking opportunities (including with international RIs and other organisations).

In 2021, EMBRC was part of several successful project bids and was very busy developing submissions for additional Horizon Europe calls.

# New projects

## EOSC-Future



### About the project

EOSC-Future is an EU-funded H2020 project that is implementing the European Open Science Cloud (EOSC). EOSC will give European researchers access to a wide web of FAIR data and related services. The project kicked off April 1st, 2021, and EMBRC was added through an amendment in December 2021.

### EMBRC's role

Together with LifeWatch ERIC, EMBRC will work to use genomics data, particularly from the Artificial Reef Monitoring System (ARMS) deployment EMBRC has carried out as part of the ASSEMBLE Plus project and EMO BON, to assess the impact of Non-Indigenous Invasive Species (NIS) in European ecosystems (NIS-Impact)'.

In particular, EMBRC will contribute to the following tasks:



Combining metabarcoding with species occurrences data



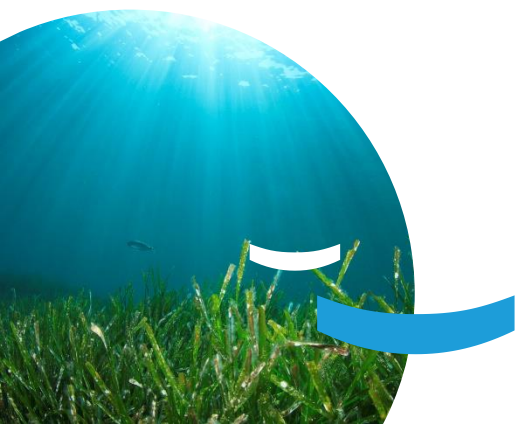
Establishing access to marine biotic and abiotic datasets



Supporting the integration of datasets with the appropriate EOSC core technical layers and web services



Contributing input to develop the analytical frameworks, conducted by other RIs



**EMBRC partners in EOSC-Future:** EMBRC HQ; EMBRC-GR (HCMR)

Project budget: €42,077,088.84

EMBRC budget: €125,000

Project website: <https://eoscfuture.eu>

Project dates:

The EOSC Future project is co-funded by the European Union Horizon Programme call INFRAEOSC-03-2020 under grant agreement no. 101017536.

## **EOSC-Life Open Call Project: A Workflow for Marine Genomic Observatories Data Analysis**

### **About the project**

In 2021, EOSC-Life (see Ongoing projects below) funded a general Open Call for projects sharing data, tools, and workflows in the cloud. The call received numerous applicants, and EMBRC was successful in obtaining one of just a handful of funded projects. The proposed work is aimed at facilitating analysis of metagenomes, including data produced by genomic observatories (GOs). The project will produce data workflows allowing researchers without the technical expertise to analyse such data on their own, the opportunity to obtain results and understand the biodiversity patterns that are being shaped by the marine microbial communities.

### **EMBRC's role and 2021 highlights**

- EMBRC is involved in all three project tasks: workflow adoption, writing the workflow and 'containerisation' schema, and testing and deployment.
- The project began in November 2021 and established a workflow and tested data, which it will use for proceeding to the next steps of the project.
- The EMBRC budget for this open call project is €54,180; the project runs from 01/04/2021-31/03/2022. For complete information on the EOSC-Life project, see Ongoing projects below.

## **ISIDORe**



### **About the project**

The ISIDORe consortium, made of the capacities of European ESFRI infrastructures and coordinated networks (from structural biology to clinical trials), assembles the largest and most diverse 'research and service providing framework' to study infectious diseases in Europe.

The project aims to give scientists access to state-of-the-art facilities, cutting-edge services, advanced equipment, and expertise to study and develop strategies to contain epidemic prone pathogens, including SARS- CoV2. The project will kick off on February 24th, 2022.



## EMBRC's role

EMBRC will make marine natural libraries and culture collections of marine organisms available. In addition, it may conduct coordinated screening with the complimentary infrastructure EU-OS, which has an established screening platform for isolation of compounds (drug leads) with anti-viral, anti-inflammatory, and other activities directed at infectious diseases.

EMBRC will also provide access to: i) metabolically unique organisms and collections that have vast and undocumented molecular diversity, providing leads for current and future infectious disease challenges, ii) screening approaches, including disease circulation screening through anonymous measures in environmental samples, water sediment, filter feeders used for human consumption, and iii) screening capabilities for developing and testing alternative vaccine adjuvants (eg complex polysaccharides of marine origin).

**EMBRC partners in ISIDORe:** EMBRC HQ; EMBRC-PT (CCMAR); EMBRC-IT (SZN)

**Project budget:** €2,099,8624

EMBRC budget: €48,750

Project dates: 7/3/22-6/3/26

The ISIDORe project is co-funded by the European Union Horizon Programme call HORIZON-INFRA-2021-EMERGENCY-02 under grant agreement no. 101046133.

## RI-VIS Kick-Start Awards

### About the project

Funded as part of RI-VIS (see Ongoing projects), this project, which ran from May 2021 to October 2021, was a pilot for EMBRC to support a bioprospecting project conducted by the Institute for Microbial Biotechnology and Metagenomics (IMBM), University of Western Cape, South Africa.

The project experienced some difficulty in the production of the target bioactive substance, which limited the breadth of work that was originally planned.

However, it opened the opportunity to test further products, leading to high quality results and outputs. Project success can also be attributed to what was considered excellent communication, and constructive and informative discussions between partners.

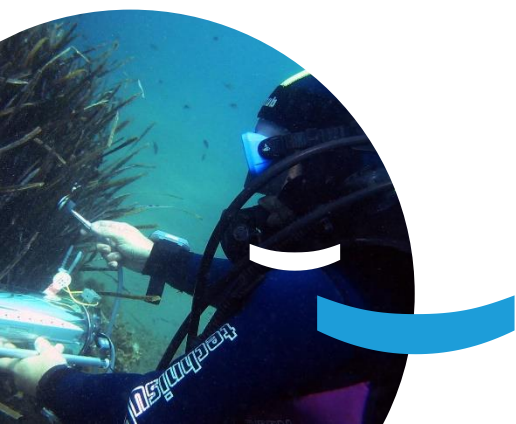


## EMBRC's role and 2021 highlights

One of two main project partners, EMBRC played a key role in the project's development and implementation during the pre-determined timeline. Given the success of this initial collaboration, EMBRC and IMBM are enthusiastic to continue working together and will seek funding to take the project to the next step, incorporating deeper exploration of bioactive compounds including a broad screening for bioactive properties of the compounds. Moreover, the partners have discussed the possibility of additional training and skills development opportunities. EMBRC believes that this type of collaboration may pave the way for larger inter-continental (early) product development opportunities.

The project has been an important opportunity for EMBRC to valorise its bioprospecting capabilities, which is one of the RI's strategic priorities. It has also been an opportunity to establish a strong relationship with IMBM, and to access South Africa's unique biodiversity as well as IMBM's microbial collections and expertise. For IMBM, this project has offered an opportunity to tap into EMBRC's growing bioprospecting capabilities.

The EMBRC budget for this kickstart award is €10,000; the project runs from 05/2021-10/2022. For complete information on the RI-VIS project, see Ongoing projects below.



# Ongoing projects

In 2021, EMBRC continued to participate in seven EU-funded projects, listed below: ASSEMBLE Plus, AtlantECO, DOORS, EBB, EOSC-Life, ERIC Forum, and RI-VIS.

## ASSEMBLE Plus



### About the project

ASSEMBLE Plus (Association of European Marine Biological Laboratories Expanded) brings together 32 marine stations and institutes from 14 European and associated countries under the leadership of EMBRC.

The project develops new tools for marine biological research, through Joint Research Activities (JRA), and provides scientists from academia, industry and policy with a quality-assured programme of Transnational Access (TNA) and Virtual Access (VA) to marine biological stations. The partners offer a wide variety of marine ecosystems, unique marine biological resources, state-of-the-art experimental and analytical facilities with integrated workflows, historical observation data, and advanced training opportunities.

The goal is to stimulate European excellence in fundamental and applied research in marine biology and ecology, thereby improving our knowledge- and technology-base for the blue economy, policy and education purposes.

### EMBRC's role and 2021 highlights

- EMBRC is the ASSEMBLE Plus project coordinator. The project, which was planned to end in September 2021, received a one-year extension, with the new end date being September 2022.
- In terms of highlights, ASSEMBLE Plus organised its first online conference on 'Marine biological research at the frontier' from 18 to 29 January 2021 (organised by EMBRC Portugal partner and project participant CCMAR). A brokerage event was organised to provide a platform for researchers, companies, and equipment providers to meet and discuss cryopreservation of marine organisms, and to present new tools and resources available and exchange ideas.
- In addition, ASSEMBLE Plus carried out its annual global Ocean Sampling Day (OSD) campaign on 21 June 2021. Launched in 2014, OSD brings together scientists worldwide to take samples from the ocean to identify microorganisms present in the seawater.

**EMBRC partners in ASSEMBLE Plus:** EMBRC HQ; EMBRC-FR (SU); EMBRC-ES (PiE-UPV/EHU); EMBRC-GR (HCMR); EMBRC-IL (HUJI); EMBRC-IT (SZN); EMBRC-PT (CCMAR); EMBRC-BE (VLIZ); and EMBRC-UK (SAMS, MBA, USTAN, NERC-BAS, MSS).

Project budget: €9,999,911.48

EMBRC budget: €280,162.13

Project website: [www.assembleplus.eu](http://www.assembleplus.eu)

Project dates: 1/10/21-30/9/21

The ASSEMBLE Plus project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 730984.

## AtlantECO



### About the project

AtlantECO provides a holistic and innovative approach to assess and predict changes in the state and dynamics of Atlantic ecosystems and services at multiple spatio-temporal scales. It assembles the first comprehensive and most extensive knowledge base of genomics, imaging and carbon flux at the scale of the whole Atlantic Ocean, integrating a decade of innovative scientific knowledge about microbiomes that support water column and seabed ecosystems.

AtlantECO uses its knowledge base as well as multi-decadal time series to assess the status and dynamics of Atlantic ecosystems and to identify regime shifts and tipping points in response to drivers of short- and long-term changes. It further works to improve the sustainability of Atlantic ecosystem services and will enhance blue growth. The active involvement of private and public stakeholders as well as of policy makers and institutions allow for addressing the socio- economic challenges of Blue Growth while reducing knowledge gaps.



## EMBRC's role and 2021 highlights



EMBRC is involved in the sub-task on biobanking protocols and collaboration agreements for participating biobanks in Europe, Brazil and South Africa for the preservation of samples collected in national and international waters, in compliance with access and benefit-sharing (ABS).



Due to lasting and ongoing effects of COVID-19, several activities in AtlantECO necessitated being pushed back. The Atlantic Ocean Sampling Day and summer classes coordinated by HCMR and UGent, respectively were pushed back to early 2022. EMBRC did participate in providing advice on ABS and best practices around sampling.

**EMBRC partners in AtlantECO:** EMBRC HQ, EMBRC-GR (HCMR), EMBRC-ES(UVigo) & EMBRC-BE (UGent)

---

**Project budget:** €10,925,660.13

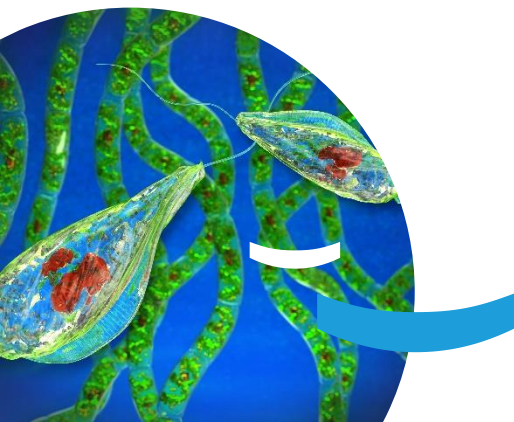
EMBRC budget: €17,641.80

---

**Project website:** [www.atlanteco.eu](http://www.atlanteco.eu)

Project dates: 1/9/20-31/8/24

The AtlantECO project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 862923.



## About the project

DOORS (Developing an Optimal and Open Research Support system to unlock the potential for blue growth in the Black Sea) plans to harmonise research and provide the infrastructure to better understand the Black Sea, particularly its ecosystem characteristics. The project will also develop the framework to support Blue Growth and early development of start-ups, and provide evidence to inform policy and behavioural change. To reach its ambitious objectives, the project team will work closely with stakeholders from the start to develop an open research system and establish a framework to support continuous stakeholder dialogue.

DOORS will implement three Work Programmes: a System of Systems to harmonise approaches and provide an accessible data repository, a Blue Growth Accelerator to support enterprise, and Knowledge Transfer and Training to share best practice and build capacity.

## EMBRC's role and 2021 highlights



The project Kicked-off in June 2021 and since the beginning of this project, activities have involved web mapping to compile all information on Research Infrastructures and marine data aggregators available in the Black Sea and developing a web-based tool mapping the Black Sea observing capacities and Research Infrastructures. In the short time of the project's launch, work with the BRIDGE-BS consortium has been completed to support the proper engagement of all categories of stakeholders and generate a multiplier effect for the successful implementation of the Black Sea Strategic Research and Innovation Agenda in all its aspects. EMBRC began the task 7.1 developing formal and informal learning, education, training and use of knowledge and technologies.



EMBRC began the process of conducted assessment of the gaps and opportunities on education and training around the Black Sea, using surveys for collecting the 'Blue Growth' priorities for the Black Sea region from each country and information on existing training programmes. These data will be used to guide the decision on the format and priorities of a future high-profile master's programme for the Black Sea region.

**EMBRC partners in DOORS:** EMBRC HQ; EMBRC-BE (UGent)

**Project budget:** €9,000,000

EMBRC budget: €100,000

**Project website:** [www.doorsblacksea.eu](http://www.doorsblacksea.eu)

Project dates: 6/21-6/25


**The DOORS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 101000518.**


## About the project


Completed in April 2021, the EBB (European Marine Biological Resource Centre Biobank) project aimed to contribute to ensuring the practical, long-term transnational coordination of marine biobanks. This initiative, the first of its kind worldwide, increased the diversity and quality of marine biological resources made available to user communities, facilitating their biotechnological valorisation.


EBB set the standard for harmonised operation of its distributed marine biobanking facilities, by developing new technological tools and common procedures for the ex-situ maintenance of diverse groups of marine biological resources. Furthermore, the project harmonised the trans-regional application of the regulations on access to genetic resources and sharing the benefits of their use (ie ABS regulations).

## EMBRC's role and 2021 highlights

- 

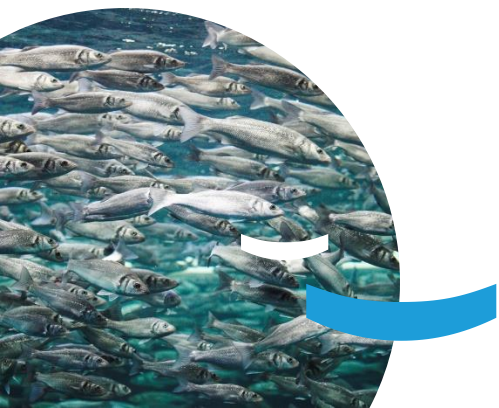
EMBRC Spain partner UVIGO served as the project coordinator, with HQ and other partners supporting activities.
- 

EBB held its final meeting in March 2021, after receiving a six-month extension due to delays related to COVID-19. During the project's lifetime, EMBRC provided input on compliance for collections and fundamental research using marine biological resources and participated in training webinars on ABS.
- 

Accomplishments in 2021 included the creation of TRACK, an e-tool designed to manage and provide access to data pertaining to sampling and maintenance of marine biological resources from biobanks (collected in the wild, in sample collections or cultured). In addition, EBB carried out two internal audits of the ABS status of the resources held in collections. A step-by-step guide for ABS compliance when utilising marine genetic resources was produced as well as a handbook on implementation of EBB best practices and sample identification system.<sup>8</sup>
- 

EBB ultimately set the basis for the common operation of EMBRC's distributed marine biobanking facilities. Furthermore, the project facilitated sustainable access to Atlantic marine biodiversity, its associated data, and extractable products for local and international academia and industry users.

8. Refers to the two aforementioned documents (see ABS section): 'The EMBRC guide to ABS compliance: Recommendations to marine biological resources collections' and users' institutions' 'Seek, keep & transfer: A step-by-step guide to ABS compliance when utilizing marine genetic resources'



**EMBRC partners in EBB:** project coordinator: University of Vigo, UVIGO (EMBRC-ES); additional partners: EMBRC-FR (SU), EMBRC-PT (CCMAR), EMBRC-ES (PiE-UPV/EHU)

---

**Project budget: €1,499,908.35 (INTERREG Atlantic Area programme); €500,000 from project partners**

EMBRC budget: €

---

**Project website: [www.bluebiobank.eu](http://www.bluebiobank.eu)**

Project dates: 16/10/21-15/4/21

**The DOORS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 10100518.**

## EOSC-Life



### About the project

EOSC-Life brings together the 13 life science research infrastructures (LS RIs) to create an open collaborative space for digital biology. The project works to transform European life science by providing a continent-scale, collaborative and interdisciplinary environment for data science with a goal of enabling life scientists to find, access and integrate life-science data for analysis and reuse in academic and industrial research.

By publishing data and tools in a Europe-wide cloud, EOSC-Life aims to bring the capabilities of big science projects to the wider research community. Through EOSC, scientists are able to gain direct access to FAIR data and tools in a cloud environment available throughout the European Research Area and make LS RI data resources FAIR. Scientists can further publish their data in the EOSC following guidelines and standards, which in turn may help to increase the availability and use of data generated by the RIs.





## EMBRC's role and 2021 highlights

- EMBRC participates in the development of a comprehensive model for providing data and access tools via the cloud.
- In 2021, the EOSC-Life project achieved several scientific outputs, such as guidance and policy on standards and tools facilitating the sharing and reuse of multimodal data (including imaging), cohort integration, and biosamples. In addition, the project produced data standards for observational and interventional studies, developed guidelines on interoperability between healthcare and research data, and started the development of a public database pooling together national health database registries, describing their access procedures for data reuse for research purposes.
- FAIR data management standards were developed for protecting genetic resources, a FAIRassist software and common provenance model for processing biological data. EMBRC conducted an internal survey of its stations to get feedback on their provenance management. An Open Call to provide a fast, coordinated and user-oriented way to start building RIs' connection to EOSC was launched and approved projects, one of which EMBRC was given funding for (see A workflow for marine Genomic Observatories data analysis).

**EMBRC partners in EOSC-Life:** EMBRC HQ; EMBRC-ES (ECIMAT/UVIGO, PiE-UPV/EHU); EMBRC-FR (SU); EMBRC-PT (CCMAR); EMBRC-BE (UGent, VLIZ)

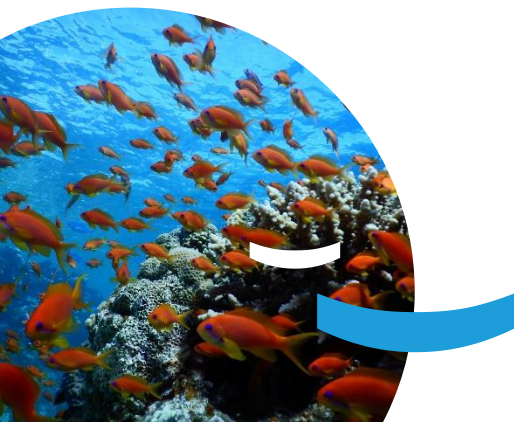
**Project budget:** €23,745,996.25

EMBRC budget: €408,750

**Project website:** [www.eosc-life.eu](http://www.eosc-life.eu)

Project dates: 1/3/21-28/2/23

The EOSC-Life project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 824087.



## About the project

The ERIC Forum project aims to advance operations of organisations (like EMBRC) with the status of a 'European Research Infrastructure Consortium' (ERIC) and to strategically contribute to the development of ERIC-related policies. This project involves all existing organisations with ERIC status and consortia. In particular, the project's objectives are to:



Strengthen coordination and networking amongst ERICs;



Support the organisation of specific meetings, targeted thematic workshops focusing on shared challenges;



Support organisations that wish to apply for ERIC status;



Support common communication and outreach activities, and strengthen external representation of ERICs as a stakeholder in consultations and other policy actions that could affect them.

## EMBRC's role and 2021 highlights

- EMBRC's role in this project includes participating in the development of sustainability plans as well as providing insight into the process and nuances of becoming an ERIC.
- In 2021, EMBRC took part in a two-day workshop on the topic of research quality and reproducibility, which resulted in a document report. EMBRC contributed to the second policy brief on 'scaling-up research projects through ERICs: impact of big science on the research ecosystem', which will be published in 2022.
- Drawing on insights and best practices learned from the project, EMBRC-ES organised a first meeting with Spanish RIs, which brought together 50 attendees. The meeting addressed topics including how to create a national forum for RIs, and how to share and contribute to RI-related policies

**EMBRC partners in the project:** EMBRC HQ; EMBRC-ES (ECIMAT-UVIGO, PiE-UPV/EHU); EMBRC-FR (SU)

**Project budget:** €1,495,281.25

EMBRC budget: €34,100

**Project website:** [www.eric-forum.eu](http://www.eric-forum.eu)

Project dates: 1/1/19-31/12/22

The ERIC Forum project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 823798.


## About the project


The RI-VIS project aims to increase the visibility of European RIs to broader scientific communities, industry and strategic partners in third countries. RI-VIS targets communities and stakeholders with current and precise information and matches them with RIs to facilitate the development of new collaborations, user accessibility, collaborative and innovative actions, funding opportunities, knowledge transfer and training opportunities.


Project activities include a mapping of RI services to target new communities and identify routes to maximise the exchange of information

and bases for new partnerships, a component of the project that EMBRC will strongly benefit from. Originally set to conclude end July 2021, the project was given a six-month extension to 31 January 2022.

## EMBRC's role and 2021 highlights

- 

EMBRC supported communications activities, as well as exchange of best practices to support the long-term sustainability of RIs. From March to June 2021, EMBRC led a nine-part training series on communications and marketing designed for EU RI communications professionals, attended by more than 40 EU RI communications professionals.
- 

Also in 2021, EMBRC participated in three symposia bringing together stakeholders from Latin American, African, and South African RIs (and relevant institutions) to connect with European RIs, science policy organisations, and research institutions. The aim was to raise awareness of individual RIs and foster collaborations.
- 

Finally, EMBRC led the creation of two roadmaps for the development of contextually appropriate, international communications strategy, highlighting cultural sensitivity and language, which may affect international collaboration in general. The documents are available for download on Zenodo:

Communication guidelines for European research infrastructures: engaging with stakeholders in Latin America:  
<https://zenodo.org/record/5793657#.YdMEKS2ZPYU>

Communication guidelines for European research infrastructures: engaging with stakeholders in African countries:  
<https://zenodo.org/record/5793442#.YdL4lC2ZPYU>

**EMBRC partners in RI-VIS:** EMBRC HQ, EMBRC-PT (CCMAR)

**Project budget:** €1,500,000

**EMBRC budget:** €125,375

**Project website:** <https://ri-vis.eu>

**Project dates:** 1/2/19-31/1/22

**The RI-VIS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 824063.**

# Communications



**Sabrina Gaber**

**Communications Officer**

Communications continued to be a focus throughout 2021. The Communications Officer coordinated closely with the Communications Working Group and HQ staff to develop impactful online campaigns, aiming to increase our online presence and overall visibility. Internally, a goal remained strengthening communication between HQ and its member countries.

## Campaigns

In 2021, we rolled out two new and exciting campaigns in view of increasing our online presence and overall visibility to attract more users, among other goals.

### Marine Scientist Monday



The first campaign, launched in January, was #MarineScientistOfTheMonth, featuring texts written by Ibon Cancio (EMBRC Spain, PiE-UPV/EHU) on historical figures working in marine science. Each piece entertained our readers with witty and informative insights into the fascinating lives and scientific discoveries of some of marine science history's greats.

## Model Organism of the Month

We launched a second campaign, called #ModelOrganismOfTheMonth, in March 2021, to promote marine organisms as models to better understand the inner workings of other organisms - including humans! We further aimed to show how these insights can lead to important scientific discoveries, the development of novel therapies, biotechnological innovation, and more - while spurring interest among readers in using these model organisms for research purposes at EMBRC sites.

We ran this monthly campaign for five months, featuring diverse marine model organisms: the sea urchin, sea lice, octopus, seahorse, and catshark. A huge thanks to the contributors within EMBRC member countries (ie the 'nodes')!



*Scyliorhinus canicula* eggs. ©Ronan Lagadec, OOB

**'A chondrichthyan reference, the catshark *Scyliorhinus canicula*'** (5/7/21) (authors: R. Lagadec, H. Mayeur, P. Romans, Weymouth, V. and S. Maran, Sorbonne University-CNRS, UMR7232-BIOM and FR3724-Observatoire Océanologique, Banyuls-sur-Mer, France)



Sea horses. ©Jorge Palma

**'Seahorses: not your average fish!'** (1/6/21) (author: Jorge Palma, Doctorate Researcher, CCMAR / University of Algarve, Portugal)



Octopus. ©iStock

**'The octopus: it may be spineless, but this organism is far from weak!'** (11/5/21) (author: Andrea Tarallo, EMBRC Italy project manager)



Sea lice. ©Lars Hamre

**'Sea lice: not just any blood and skin-sucking parasite!'** (2/4/21) (author: Frank Nilsen, Professor, Department of Biological Sciences, University of Bergen, Norway)



Sea urchin. ©iStock

**'Sea urchins: gamete "production powerhouses" that serve as excellent models'** (18/3/21) (authors: Estefania Paredes Rosendo, University of Vigo (UVigo, Spain); Maria Ina Arnone, Stazione Zoologica Anton Dohrn (SZN, Italy); Jenifer Croce, LBDV – *Institut de la Mer de Villefranche* (IMEV, France); Stefania Castagnetti, LBDV – *Institut de la Mer de Villefranche* (IMEV, France), Eva Jimenez-Guri, Centre for Ecology and Conservation, University of Exeter)

View all 29 Marine Scientist Monday & Model Organism of the Month texts:

<https://embrc.eu/campaigns>

## Crown jewels: EMBRC service features

After piloting the model organism campaign, which proved to be quite time-consuming, given the significant amount of research required, we shifted gears mid-year to focus more specifically on our services. This led us to introduce, in June 2021, a new campaign focusing on services. For this purpose, we created a new web page section (<https://embrc.eu/featured-services>) devoted to our 'crown jewels', or our featured services.

Between June and December 2021, we published five such service features, thanks to contributions from our Spanish, Portuguese, Norwegian, and UK country members:

- **'EMBRC Spain: One Health Marine Lab (ONEMARLAB)** (at PiE-UPV/EHU): 3 services for One Health research: environmental monitoring network, environmental specimen bank for retrospective (eco)toxicological studies, experimental toxicological research aquaria unit' (17/12/21)
- **'EMBRC Portugal: Ramalhete Marine Station (CCMAR): Aquarium facility for experiments in several marine research areas'** (18/12/21)
- **'LiceLab at EMBRC Norway: Marine model organisms at Sea Lice Research Centre of University of Bergen, Norway'** (18/10/21)
- **'Culture Collection of Algae and Protozoa (CCAP) at the Scottish Association for Marine Science'** (16/7/21)
- **'EMBRC Italy: SZN's marine organism taxonomy facility is facilitating strain isolation! Marine Organism Taxonomy (MOTax) unit'** (28/6/21)

# Social media

Following a social media audit in 2020, which included an inventory of all HQ-level and country-level communications channels (including channels for individual marine stations and 'operators'), we streamlined our social media activity to focus on two channels: Twitter and LinkedIn, and this continued to be our focus in 2021.

We published our campaigns on social media, and actively engaged with content from our EU RI peers, and like-minded institutions in order to increase our visibility in the EU landscape, including among policymakers and institutions such as the European Commission. We asked our country members to provide social media 'thought leaders' to ensure that we are following those accounts, and, ideally that they are following us.

## Twitter


We saw a continuous, steady increase in our Twitter followers, which reached around **2,500 followers** by end 2021, an increase of nearly 60% followers compared to 2020. We also reached record 'impressions' for Tweets regarding the launch of EMO BON (June 2021, 12,879 impressions) as well as the MoU with EMBL (February 2021, 15.5k impressions).

**Jun 2021** · 30 days

TWEET HIGHLIGHTS

**Top Tweet** earned 11.9K impressions

As if Monday couldn't get more exciting, we have some thrilling news!  
EMBRC is launching the European Marine Omics Biodiversity Observation Network (EMO BON) today!  
#EMOBON is the 1st coordinated, long-term genomic biodiversity observatory in Europe  
[embrc.eu/newsroom/news/...](http://embrc.eu/newsroom/news/...) 1/  
[pic.twitter.com/GmarFc13Bj](https://pic.twitter.com/GmarFc13Bj)



2 19 46

**Feb 2021** · 28 days

TWEET HIGHLIGHTS

**Top Tweet** earned 15.5K impressions

We're thrilled for this MoU with @embl!

"We are looking forward to supporting EMBL's new programme and to offering our respective communities new and exciting research, innovation, and knowledge-exchange opportunities," says Nicolas Pade.

Read article for more info  
[twitter.com/embl/status/13...](https://twitter.com/embl/status/13...)

5 21

## LinkedIn

On LinkedIn, the focus in 2021 was on innovative content creation, particularly for the latter half of the year, where we became more active in our posting. As we had deleted our redundant personal LinkedIn account in 2020, we were able to fully focus our efforts on our company page. One feature we took advantage of was the 'notify employees' option on post, enabling EMBRC HQ staff to interact more easily with our latest content, increasing visibility and engagement.

In parallel to the service feature campaign, we developed a monthly calendar for our nodes to contribute LinkedIn articles, increasing our online presence while contributing to current discussions in marine biology. Countries were free to develop a text on any marine biology 'hot topic', or any other topic related to events, EMBRC services, activities, or research carried out by EMBRC. The aim was to create interesting discussions around EMBRC and highlight the areas in which we are competent. These monthly posts, which started around June 2021, were either posted directly on the node's LinkedIn account, the operator account, or by EMBRC HQ. The result was a considerable increase in our LinkedIn performance, particularly regarding page visitors. In terms of followers, we finished 2021 with about 1,500 followers, nearly doubling our followers from the previous year (around 750 end 2020).





## YouTube and multimedia

In 2021, we saw an increase in our number of YouTube subscribers (reaching over 100 in January 2021). This achievement enabled us to customise our channel URL, which became:

<https://www.youtube.com/c/EMBRC> While we did not proactively engage in video content production during the year, we benefited from the footage of partner events to update our channel. In particular, we added 22 videos from the January 2021 ASSEMBLE Plus online conference, as well as the new EMBRC Israel (IUI) feature video. Our top video, in terms of views, remained the two-minute general presentation video of EMBRC, which had around 400 total views by the end of the year (posted September 2020).

In 2021, we also developed the specifications for a new, digitally animated video on the 'ABC's of using EMBRC services'. We coordinated with a video production company (Kino) located in Paris for this purpose and sent our feedback towards the end of the year. We expect to finalise and publish the video early 2022.

We also participated in EMBRC UK partner MASTS' 2021 webinar series on diverse marine biology topics. The weekly series ran from 3 February 2021 to 1 July 2021; EMBRC speakers were featured for the month of June:



**EMBRC**  
EUROPEAN  
MARINE  
BIOLOGICAL  
RESOURCE  
CENTRE




- MASTS and EMBRC webinar with Kim Præbels, EMBRC-NO (2 June 2021): 'Marine environmental DNA in the Anthropocene: Applications in the Arctic and subArctic' (86 views)
- MASTS and EMBRC Webinar with Helene Langehaug, EMBRC-NO (9 June 2021): 'Propagation of Thermohaline Anomalies and their predictive potential in the Northern North Atlantic' (123 views)
- MASTS and EMBRC webinar with Luigia Santella, EMBRC-IT (SZN) (23 June 2021): 'What Happens when Sperm Meets Egg: A Revisitation of the Process' (50 views)
- The MASTS series was a fantastic way to give more visibility to EMBRC and to its expert researchers working within the nodes. They attracted large, often global, audiences and the recordings of the webinars on YouTube typically received around one hundred views in the first week of being available.

# Website and publications

Following the launch of a more user-friendly website in November 2020, we continued to enhance features and functionalities on the website throughout 2021. We added dedicated pages for the new ABS guideline documents, EMO BON (including a map of participating stations, and links to related documents/resources and news), and featured services.

In terms of performance, during the year, we had 75,203 website views and 38,120 website users. In terms of the top 10 most visited pages, they were as follows (according to Google Analytics):

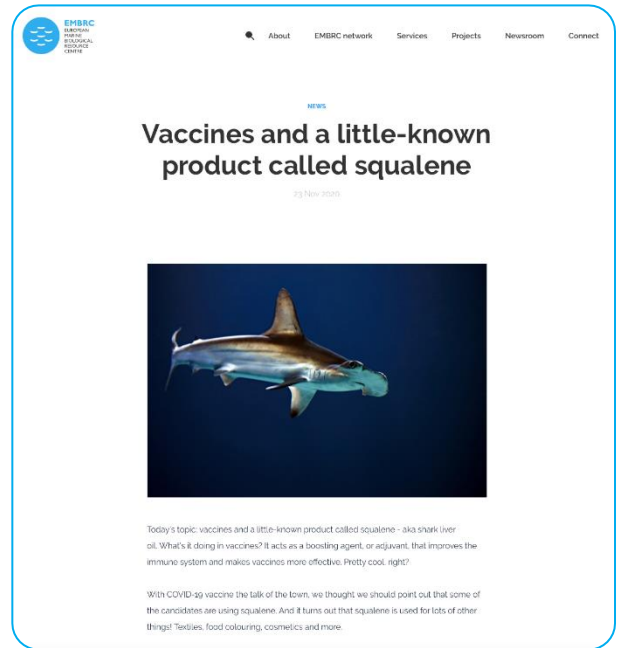
1. News article: 'Vaccines and a little-known product called squalene' (published in Nov 2020, but viewed throughout 2021): 1,950 'total events'<sup>9</sup>
2. EMBRC publications page: 337 total events
3. EMBRC Spain presentation page: 263 total events
4. EMBRC France presentation page: 248 total events
5. About research infrastructures page: 223 total events
6. EMBRC Italy presentation page: 213 total events
7. Homepage: 211 total events
8. EMBRC Belgium presentation page: 200 total events
9. EMBRC Portugal presentation page: 194 total events
10. EMBRC Norway presentation page: 171 total events



9. An 'event' on Google Analytics is when an Internet user performs an action on your website. Events can be measured independently of loading a new page. Different examples of web analytics events include: clicking on a link, watching a video, downloading a resource, or sending a form.



Website user behaviour is indicative of various trends: first, there is strong interest in understanding the EMBRC nodes, and who exactly makes up the EMBRC 'network'; second, users want to see our scientific publications (to see what we're publishing and/or to view our available reports, guidelines, and other documents); and, third, and perhaps most importantly, we can increase our reach by communicating on relevant 'hot topics' including vaccines and COVID, as was the case in 2021 (the topic of our most-viewed news article).



In terms of traffic to the website from social media, our main source of traffic was Twitter (accounting for 56.29% of clicks from social in 2021); in second place was, ironically Facebook, which we did not actively update (yet this shows that we are still very much 'findable' on there); and, in third place, was LinkedIn, which accounted for 16.38% of traffic to the website coming from social.



As for user demographics, most website users in 2021 came from the U.S. (12,672 users, or 38.82% of users), with the UK in second place with 4,610 users (or 14.12% of users), followed by France, Spain, and Italy, with around 2,000 users (or just over 6% of viewers) each. The prevalence of U.S.-based users is likely due to the fact that we communicate in English and are easily findable among English speakers.



## Services catalogue and ARIA

A huge milestone was the finalisation of an application platform (ARIA), which now links to our service catalogue (<https://www.embrc.eu/services/service-catalogue>). In one simple click (Apply button), users can apply for one or more EMBRC services, and email directly with platform technicians. We also enhanced the service catalogue search menu and filters to make it easier to find relevant services. Users can now more clearly see in the left-hand column, for example, which institute is located where (by adding the city name after the institute's acronym). We also added hyperlinks to contact information, so that users can simply click on the email(s), and a new email opens automatically in their email client.

### Ecosystem access

#### Coastal research vessels at IMEV - Villefranche sur mer

On-site access, Institut de la Mer de Villefranche, France

#### Description :

Coastal research vessel for access to Villefranche Bay. Platform name: Moyens à la Mer (MAM)

#### Contact :

[gemma.gimenez\\_papiol@sorbonne-universite.fr](mailto:gemma.gimenez_papiol@sorbonne-universite.fr), [raffaella.cattaneo@imev-mer.fr](mailto:raffaella.cattaneo@imev-mer.fr)

Apply

## Your Proposals

You can begin a new proposal, or check proposal status on your dashboard.

[Begin a New Proposal](#)[View Proposal Dashboard](#)

You have the following draft proposals available to continue working with:

## Proposal Guidelines

**Click on "Begin a new proposal" (in the left column) and then follow the steps below.**

**Step 1: select the services** required for your experiments. To refine your query you can use filters (country, institute or service category). Click on "Select service" to add it to your proposal. To add another service, go to the following step and then click on "Add another service".

**Step 2: confirm the services** you have requested. If a service is offered also by remote access (i.e. your experiments do not need your presence at the premises of the institute and can be performed by our technicians), you can select this option here. Remote access is not available for all of our services.

**Step 3: enter details** of your request. Click on "?" for more specifications or suggestions about each field.

Click on "Save proposal" to save a draft of the proposal, as filled so far. In case you want to work offline on the proposal, you can find here the [EMBRC access request template](#).

Click on "Save and continue" to go to the next step.

**Step 4: add team** members working with you in this proposal.

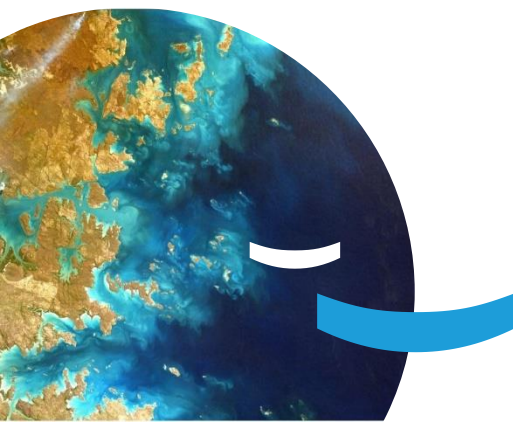
- Main applicant: it is you.
- Other team members in the proposal: a member of your team or a colleague who will have access to the proposal (editing and submission).

Click on "Save the proposal" to save a draft or on "Save and continue" to go to the next step.

**Step 5: check submission** by reviewing the details of your proposal (services requested, your profile information and technical details, team members involved in this proposal).

**Step 6:** please read our terms and conditions, accept them by clicking on the checkbox and then **submit the proposal**.

**Step 7: proposal submitted.** In case of problems or issues with your proposal, please contact [access@embrc.eu](mailto:access@embrc.eu). Please mention the proposal identifier (PID) created at this step.



# Internal communications



The Communications Working Group (WG), composed of one or more representatives from each EMBRC member country, met virtually six times in 2021. The WG continued to be instrumental in providing HQ with input on how to enhance and align communications throughout the RI, particularly between the country members ('nodes') and HQ.



The Communications WG provided input on the 2021 communications strategy and supported its development throughout the year at country-level. One-on-one meetings with select members, as feasible given COVID travel restrictions, took place with the Norwegian and French members in December 2021.



Other activities to enhance and professionalise communications across the organisation included the redesign of poster templates and the finalisation of the general PowerPoint presentation.

## Other communications activities

The Communications Officer was involved in diverse additional communications activities throughout the year. For example, in July 2021, she provided two training courses to master's students in the Erasmus Mundus Master of Science in Environmental Contamination and Toxicology ECT+. The topics covered included: 'Communicating for European Research infrastructures (RIs)' 13 July 2021 and 'Social media for scientists' (15 July 2021).

The Communications Officer was also heavily involved in the RI-VIS project throughout the year (see Projects), co-coordinating (with the EMBRC Portugal/CCMAR Communications Manager) the development and implementation of a training series for communications professionals and the drafting of guideline documents on engaging with stakeholders in Latin American and Africa countries.



*Cover image of the RI-VIS communications guidelines on engaging with international stakeholders (see Projects).*





## EMBRC team



**Alexandra Vasic**

**Chief Financial &  
Administrative Officer**



**Guillaume Duspara**

**Administrative Assistant**

## Policies

### Teleworking

In 2021, we continued to improve collaboration, collective performance, well-being and overall employee experience. Indeed, after months of working in sub-optimal conditions due to COVID-19 (ie teleworking), we noticed a feeling of isolation, difficulty in disconnecting, and a lack of socialisation among certain employees. To address these issues, we set up a regular teleworking charter of two fixed days per week so that each member of the HQ team meets and works with all other staff members at least once a week.

### Memo, travel, offboarding

In August 2021, we sent out a memo to remind employees of the framework and procedures for managing leaves of absence and holidays. This document included a new policy: three paid days per year for sick children.

A specific travel policy was introduced to regulate the financial and environmental impact of travel by members of staff at EMBRC HQ. We also established an off-boarding document for departing staff at HQ to ensure a smooth transition between roles



## IT management and software

In addition, we created administrator accounts on all EMBRC HQ staff laptops and data storage devices in order to mitigate against the loss of data in the event that a member of staff does not transfer their login credentials upon leaving EMBRC. To enhance project management, we implemented new tools including Trello and TeamGantt.

## 'ERIC policies': VAT, RoOs and SLAs

The first application for a refund of the VAT paid in France since the ERIC was created was sent to the French tax office. We received a positive response, meaning that we will be refunded the VAT paid since the inception of the ERIC.

The Rules of Operation (RoOs) were also adopted in 2021, and templates for the Service Level Agreements (SLAs, operator and node versions) were likewise validated.

## Quality

In 2021, we embarked on studying ISO 9001 documentation to assess the feasibility of applying for ISO certification. It was concluded that it would be difficult to envisage its implementation within EMBRC HQ in the short term, as it would require the recruitment of an ISO standards specialist. It was decided that a Quality Management System (QMS) will be easier to implement and take less time (about a year and a half), without significant additional cost. Finally, the QMS will be 100% dedicated to EMBRC HQ, without involving the nodes, for greater effectiveness and efficiency.

## Gender equality plan

As a gender equality plan (GEP) will be a requirement for all Horizon Europe funding as of 2022, EMBRC began discussions, along with partner RIs, on the development of this document. For this purpose, the Communications Officer participated in a GEP training session, organised by the ERIC Forum project, held from 28-30 June 2021. Following the training, a Slack channel was organised to communicate specifically with other RI stakeholders on gender issues. The ERIC Forum also created a shared folder for participants with resources including sample GEPs and other guideline or reference documents. In addition, our Chief Financial & Administrative Officer liaised with the EMBRC lawyer to obtain legal insights that would be helpful for the development of the GEP, which will be drafted early 2022.

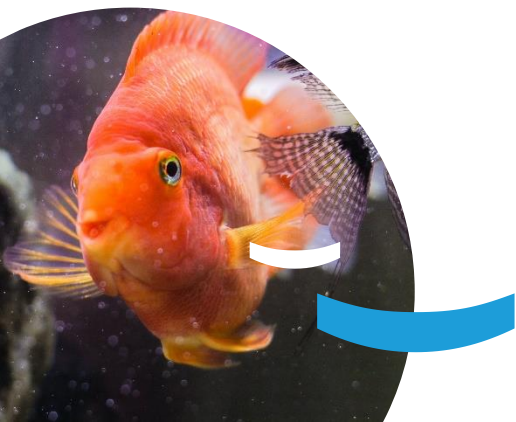


## New staff at HQ

We welcomed onboard Anne Emmanuelle Kervella, international cooperation research engineer at CNRS, who joined the EMBRC secretariat for a two-year assignment as an international cooperation officer as an in-kind contribution by the EMBRC host country. In this role, she will manage surveillance, monitoring and analysis of international policy initiatives impacting EMBRC activities. Her mission focuses on ethical, legal and social implications (ELSI) or aspects (ELSA), and specifically policies for access and use of biodiversity in research (ABS, DSI, Biodiversity Beyond National Jurisdiction – BBNJ). As such, she works closely with the ABS compliance officer.

Anne Emmanuelle had a busy 2021, starting out by co-authoring the EMBRC ABS Best Practices Guideline document: 'Recommendations to marine biological resources collections' and users' institutions', adopted in the EBB project and published on the EMBRC website in spring 2021: <https://embrc.eu/embrc-guides-abs>. In addition, in July 2021, she supervised Sarah Thomas, a master's student in international and European law for an internship on ABS provisions in the material transfer agreements (MTAs) for the EMO BON initiative. She also contributed to multiple ABS activities and initiatives (see ABS section for more information).

In 2021, we said a sad farewell to Katharine Worley, Administrative Assistant, who was EMBRC's first recruit as an ERIC. Guillaume Duspara took over this role, with the addition of providing financial support to become the EMBRC Financial & Administrative Assistant. He got off to an impressive start, introducing collaborative software to manage our work programme (the aforementioned TeamGantt), while providing support for financial and administrative management. In addition, he performed graphic design work, finalising the 2020 annual report (immediately upon his arrival in April 2021), creating the EMO BON logo, developing new EMBRC and EMO BON site maps, and more. To better understand the 'RI landscape', he attended the webinar: 'Access to research infrastructures - Infraseriv Horizon Europe'.



# Collaboration

## Community Days

Once again, the (internal) EMBRC Community Days, which would bring together representatives from each EMBRC member country (or 'node'), were postponed due to COVID-19 restrictions. The event was rescheduled for end May 2022 in Faro, Portugal (at EMBRC Portugal partner CCMAR), and preparations began at the end of 2021. Staff exchanges were also postponed due to COVID.

## New country member

The admission request by the Kingdom of Sweden to join EMBRC-ERIC as a full Member had approved by unanimity, as of the January 1st, 2022. We look forward to bringing Sweden onboard and to presenting more details about the Swedish node in our next annual report.

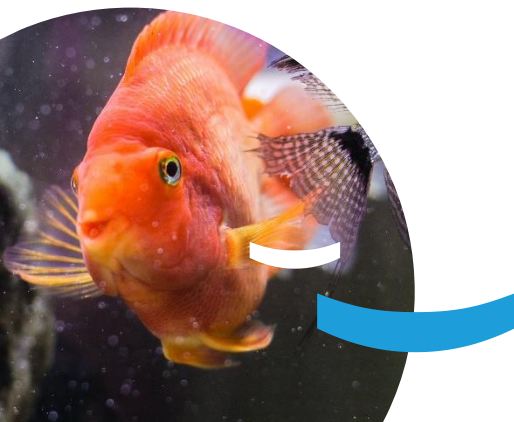
## EuroMarine and joint call

In terms of external collaboration, EMBRC became a member of EuroMarine. EMBRC made a financial contribution as well as an in-kind contribution (10% full-time equivalent) of staff time to support the secretarial work and hosting of the association (French legal entity), which is registered at the EMBRC office (Sorbonne University, Paris).

Through our cooperation agreement with EuroMarine, we also participated in a call for scientific proposals, under which EMBRC agreed to finance access to its services (€52,000 worth of services) for 11 early career researchers. See the Services section above for more information.



*Kristineberg Marine Station. (C) Matthias Obst.*



# EMBRC nodes: presentation and 2021 highlights

Meet our 'nodes' (ie country members)! This section, authored by each country, features a description of the national node as well as highlights for the year.

## EMBRC Belgium

EMBRC Belgium (or EMBRC-BE) consists of 11 internationally renowned research units, belonging to four Flemish operators : UGent (7 laboratories), KU Leuven, UHasselt, Flanders Marine Institute (VLIZ), and the Royal Belgian Institute of Natural Sciences (RBINS). Through their know-how and access to a wide range of state-of-the-art facilities, developed over decades of competitive research, they excel in various domains of marine science (ecology, ecotoxicology, biodiversity, aquaculture, fisheries, microbiology, genomics, postgenomics and bioinformatics), and provide complementary expertise.

Furthermore, EMBRC Belgium offers organismal expertise (including taxonomic excellence, a globally declining field of expertise) for specific groups (bacteria, protists, macro-algae, invertebrates and fish); high-tech infrastructure (omics platforms, research vessels and field sampling tools, experimental facilities, cultures and collections); and coordinates the ERIC-wide activities for training and education via the MarineTraining platform ([marinetraining.org](http://marinetraining.org)) and coordinates an international Master of Science in Marine Biological Resources (IMBRSea, [www.imbrsea.eu](http://www.imbrsea.eu)).



## 2021 EMBRC-BE highlights

- Secured new funding for EMBRC-BE Flemish operators via the international research infrastructure programme from the Research Foundation – Flanders (FWO) for 2021 - 2024
- Redesigned the EMBRC-BE website according to EMBRC standards
- Launched three JDA projects within the EMBRC-BE node: 1) Development of a field-based nanopore sequencing service, 2) Genetic broodstock characterisation for pedigree management in whiteleg shrimp *Penaeus vannamei* and 3) Single-cell genomics for marine organisms
- Participated in EMO BON through regular sampling at fixed stations in the Belgian Continental Shelf
- Developed new modules to support artificial hard substrate gardens for nature-inclusive, offshore wind farm designs at RBINS
- Agreement reached to use the new RV Belgica (silent multidisciplinary oceanographic & fisheries research vessel) to support EMBRC-BE access to marine resources
- Integrated Carbon Observation System (ICOS) used EMBRC-BE infrastructure from VLIZ for an pCO<sub>2</sub> inter-comparison campaign
- Fatty acid analysis at EMBRC-BE node used in diverse projects ranging from biodiscovery to fatty acids for human consumptions and human health
- Enzymares (Exploring the potential of marine-derived enzymes), an industry related VLAIO cSBO project<sup>10</sup>, started in September 2021. EMBRC-BE acted as facilitator to set up the consortium. One of the aims is improving access to and use of marine microbial enzymes by EMBRC-BE operators.
- New algal culturing and experimental facilities became fully operational at UGent research groups on Protistology & Aquatic Ecology (PAE) and Phycology



*Whiteleg shrimp *Penaeus vannamei**



*The fully colonised Artificial Hard Substrate Garden on board of RV Simon Stevin. Photo provided by EMBRC-BE.*

<sup>10</sup> VLAIO stands for *Vlaamse Agentschap Innoveren & Ondernemen*; cSBO is short for strategic basic research for clusters. This type of project is for long-term research, relatively far from market introduction, carried out by research institutes

# EMBRC France



(C) Wilfried Thomas

EMBRC France (or EMBRC-FR) is a French national research infrastructure distributed across three marine stations operated by Sorbonne University (SU) and the French National Centre for Scientific Research (*Centre National de la Recherche Scientifique*, CNRS). It has been funded by the Agence Nationale de la Recherche (ANR) since 2012.

Through the facilities at *Station Biologique de Roscoff* (SBR), *Observatoire Océanologique de Banyuls-sur-mer* (OOB) and *Institut de la Mer de Villefranche* (IMEV), EMBRC-FR provides access to Channel, Atlantic and Mediterranean ecosystems and their exceptional marine biodiversity, alongside state-of-the-art analytical platforms and experimental facilities.

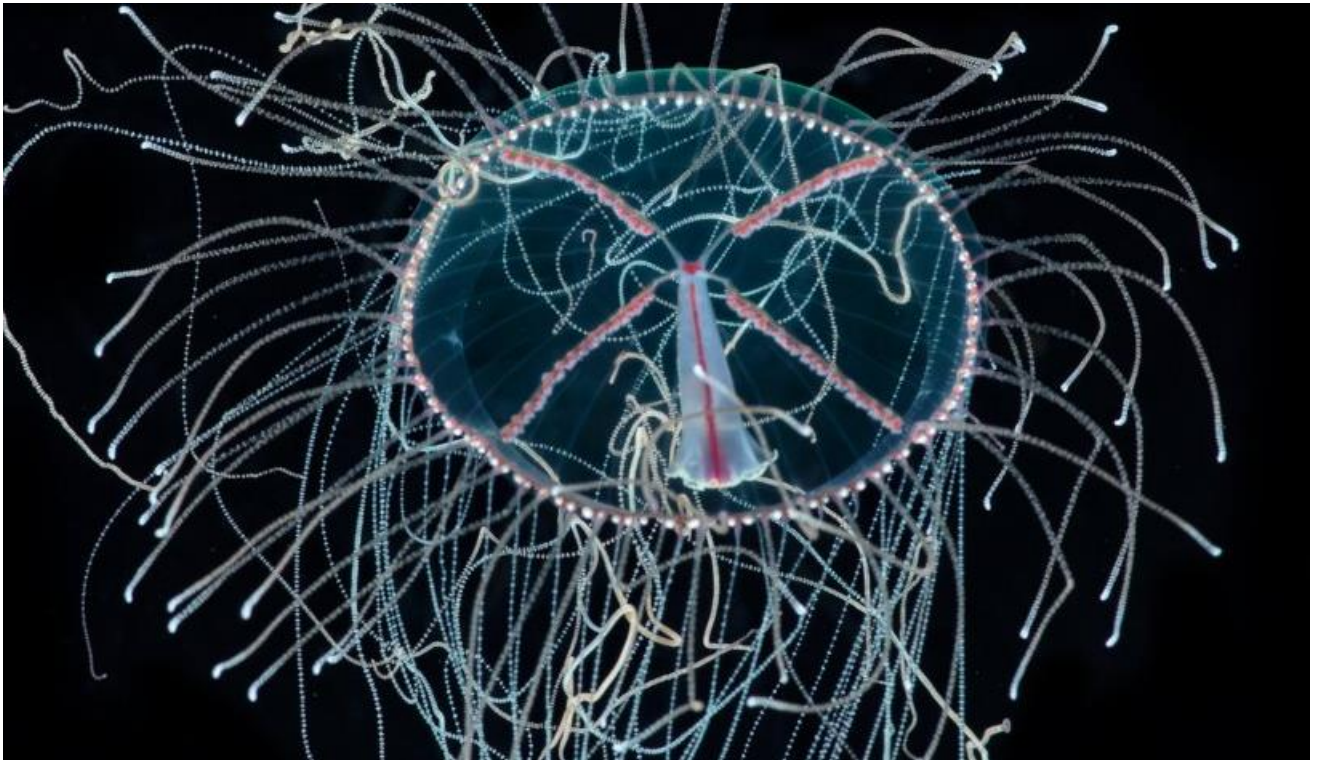
Biological resources can be supplied on-site or remotely from a range of cultured marine models or collected from wild stocks, and a wide range of microbiological strains (bacteria and microalgae; more than 5 000 strains), including mutant strains. Office space, accommodation and catering for on-site access visiting scientists, conferences, workshops, and summer schools are also available. Life-long training in the marine sciences is offered by an SU specialised service, which can design tailored training on-demand.

<sup>11</sup> Jesus C. Desdevises Y, Kloareg B, Toulmond A. (2021) 'Henry de Lacaze-Duthiers (1821-1901), the father of experimental zoology and founder of the marine stations of Roscoff and Banyuls'. *Comptes Rendus Biologies*, 344 (4): 311 – 324.

<https://doi.org/10.5802/crbio.68>

## 2021 EMBRC-FR highlights

- 2021 was the bicentenary of the birth of Henry de Lacaze-Duthiers, founder of two of the three EMBRC France marine stations<sup>11</sup>: Station Biologique de Roscoff (in 1872) and Observatoire Océanologique de Banyuls-sur-mer (in 1882). The OOB organised several events in 2021 to celebrate this anniversary; SBR will take over in 2022, coinciding with the 150th anniversary of its foundation.
- EMBRC France's administrative structure underwent changes (as it became a Unité d'appui à la recherche, or Research support unit) on January 1st, 2021; under this arrangement, it created an operational team and began to recruit four individuals for the team mid-2021
- SU and CNRS updated the original consortium agreement, signed in 2011. The new agreement lasts until end 2024, and includes the current node governance and newly created UAR2209.
- EMBRC France remained a 'Health and Biology infrastructure' in the updated French roadmap of Research Infrastructures. As such, EMBRC France participated in a discussion group, the 'Club des INBS', with other French research infrastructures on Health and Biology.



Jury Prize in the Artistic category–Alexandre Jan, IMEV 12

<sup>11</sup> Jesus C, Desdevises Y, Kloareg B, Toulmond A. (2021) 'Henry de Lacaze-Duthiers (1821-1901), the father of experimental zoology and founder of the marine stations of Roscoff and Banyuls'. Comptes Rendus Biologies, 344 (4): 311 – 324. <https://doi.org/10.5802/crbio1.68>

<sup>12</sup> Description (translated from French): *Olindias phosphorica* – *Olindias phosphorica*, a hydrojellyfish inhabiting the warm waters of the Mediterranean Sea. Encountered mainly in summer, this species has the particularity of sleeping during the day in Posidonia meadows and comes out at night to hunt. Jellyfish, plankton, Mediterranean Sea.

- The two funded Equipex+ projects in which EMBRC France participates (AO-EMBRC and MuDiS4LS) officially started in September 2021. The pre-kickoff meeting of AO-EMBRC took place on September 16th, 2021. This was an excellent opportunity to underline the convergence of various institutional initiatives (EMBRC France, EMBRC-ERIC, IFB, France Génomique, Tara GoSee, OSU Stamar, PPR Oceans) towards the implementation of augmented genomic observatories in EMBRC.
- EMBRC France participated in the ongoing projects ASSEMBLE Plus, AtlantECO, EuroMarine-EMBRC joint call and EMO BON. It also participated in three proposals submitted to the HORIZON-INFRA-2021-SERV calls.
- EMBRC France's General Assembly was held online from 8-11 June 2021, assembling 57 participants
- EMBRC France partnered in the Curiosités de la recherche (Curiosities of research) photo contest, and individuals from IMEV received awards (see photos)



*Public Prize in the Research category - Sébastien Schaub, IMEV, PIM platform<sup>13</sup>*

<sup>13</sup> Description (translated from French): A star in the middle of the sea – In the middle of the pelagic plankton, we sometimes come across radiolarians, organisms with a very characteristic skeleton. The image comes from scanning electron microscopy, combining backscattered electrons and secondary electrons. Plankton, Radiolaria, Electron Microscopy. Sébastien Schaub – LBDV – PIM platform.



# EMBRC Greece



EMBRC-GR consists of one institution, the Institute of Marine Biology, Biotechnology and Aquaculture (IMBBC) of the Hellenic Centre for Marine Research (HCMR) and it is based on the premises of HCMR in Crete. It provides access to marine habitats (water column, soft and hard substrates and seaweed and algal meadows) of the oligotrophic ecosystems of the Eastern Mediterranean Sea, an area at the forefront of climate change and biological invasions, through a scientific diving team and small boats.

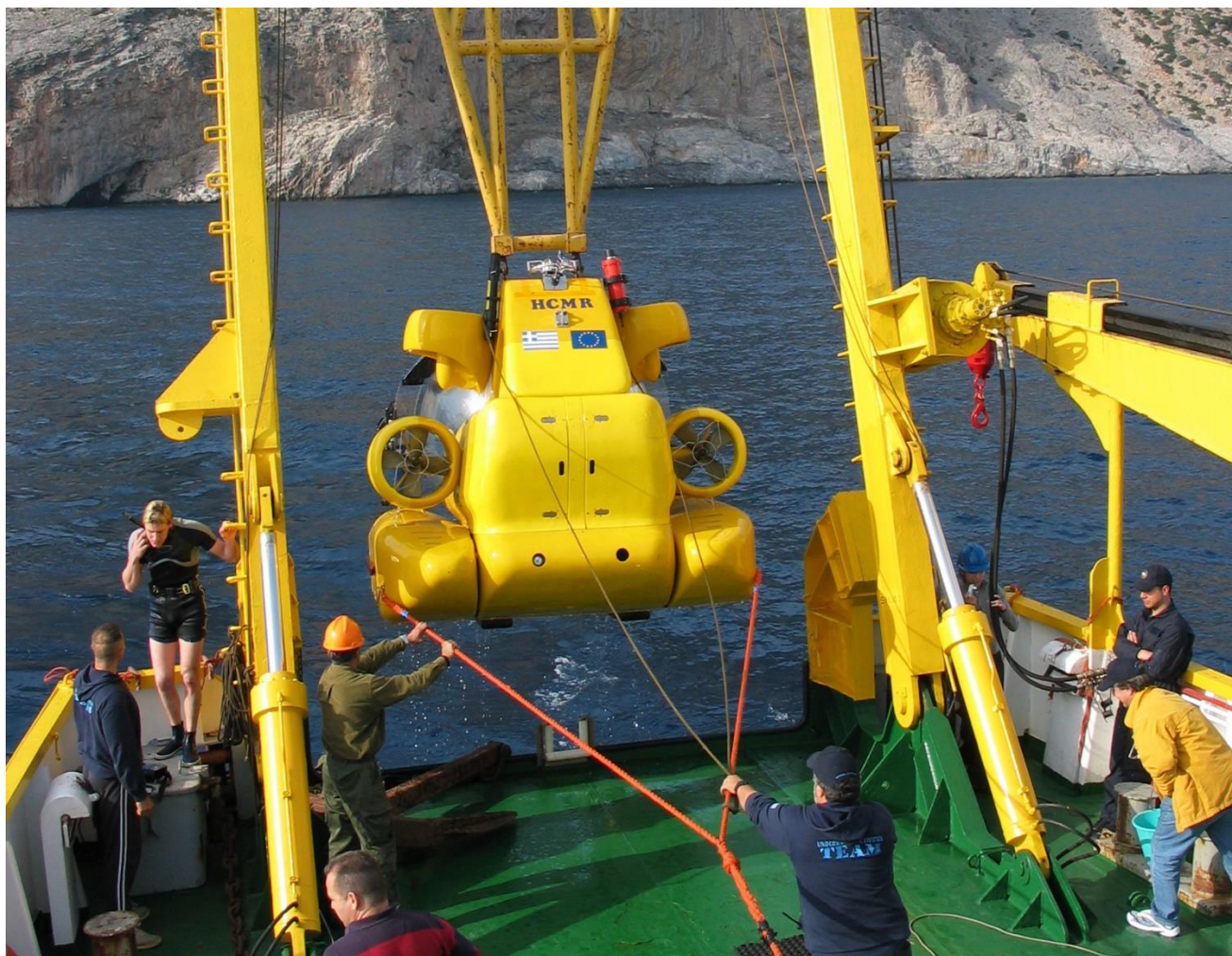
It also offers a wide range of experimental facilities for ecological, aquaculture and genetic research including: dry labs for molecular biology, ecology and taxonomy; aquaria and tanks for experiments on aquafeed testing; fish reproduction and pathology of aqua-cultured fishes, technology platforms for molecular biology and omics (DNA sequencing facility); micro-CT imaging and targeted analysis of biomolecules and metabolites.

In addition, EMBRC-GR offers e-services (data analysis tools and software for next generation sequencing, or NGS, data) on its high-performance computing cluster and expertise in bioinformatics analysis. Finally, it also provides expert advice on Mediterranean aquaculture (aquaculture, nutrition, diet formulation, reproduction, pathogens, aquaculture genomics) and biological sample identification.



## 2021 EMBRC-GR highlights

- EMBRC-GR actively supported the genomic observatories actions of EMBRC-ERIC within the ASSEMBLE PLUS project: HCMR coordinated the OSD sampling events of 2021, performed the sample processing, and finalised the major part of data production on OSD and ARMS samples collected since 2018.
- EMBRC-GR became a member of the EMO BON network and participated in all sampling events in 2021
- HCMR joined the AtlantECO project to ensure all Atlantic OSD coordination for the period 2023-2024
- Transnational Access to EMBRC-GR through the H2020 ASSEMBLE Plus project resumed in 2021, despite restrictions due to COVID-19; one remote and four on-site visits were materialised in 2021.
- Dr Panagiota (Yolanda) Koulouri, principal investigator at HCMR, was elected as one of the two co-chairs of 'The Expert Working Group on Ocean Literacy' at EuroGOOS, the European Global Ocean Observing System



# EMBRC Israel

EMBRC-IL consists of one institution: the Interuniversity Institute for Marine Sciences in Eilat (IUI), a national research/teaching/training infrastructure, focusing on the tropical Red Sea ecosystem.

IUI serves as the hub for marine researchers from all Israeli universities to promote marine biology and oceanography. It takes advantage of the Gulf of Aqaba's unique marine features including an unusually deep winter mixing, a substantial spring plankton bloom, warm waters (>20.6°C) at depth, and a lush, diverse coral reefs at a distance of only a few metres from the Institute, allowing extraordinary conditions for in situ observations and experiments. The open sea is deep (750 m) and calm, conveniently located merely 15 minutes away from the IUI pier aboard the Institute's research vessel.

## 2021 EMBRC-IL highlights

- A new academic staff position at EMBRC-IL was filled in 2021 by Dr. Akkaynak Derya. She is a mechanical engineer and oceanographer working on the reconstruction of lost colours and contrast in underwater imagery to allow efficient, automated analyses.
- A United States Agency for International Development (USAID) Middle-East Regional Cooperation grant continued between the IUI and its counterpart Marine Science Station Institute in Jordan. The project focuses on measuring the response of engineering species (coral and sea grass) to the combined effect of global and local environmental change in the Gulf of Aqaba.
- The IUI is affiliated with the Transnational Red Sea Center, a scientific research centre of the Ecole Polytechnique Fédérale in Lausanne, Switzerland. The Center bridges science and diplomacy for the study and preservation of coral reefs in the Red Sea and beyond. A continuous coral health monitoring station was established at IUI in 2021 as part of this initiative.



Coral reef, divers. ©Maoz Fine



Reef fish in Eilat.

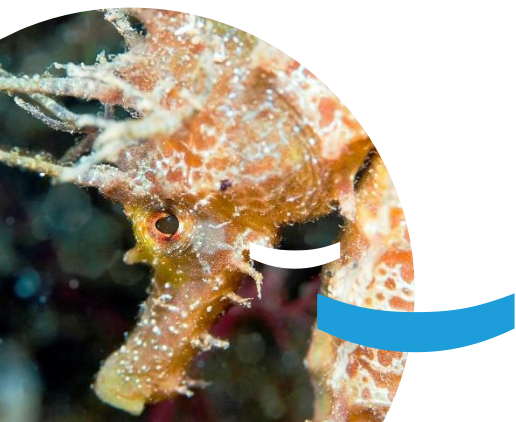
# EMBRC Italy



EMBRC Italy provides access to a wide array of unique ecosystems such as the volcanic CO<sub>2</sub> cold vents in the Gulf of Naples, which constitute natural experimental sites for ocean acidification studies, the lagoon systems of Venice and Lesina, and the salt marshes in Sicily and Sardinia, for example.

Access to these ecosystems is integrated with a complete set of modern technological platforms, such as an advanced centre for molecular biology, bioinformatics and microscopy at various partners, and the Aqua Alta experimental tower in the North Adriatic Sea. Access to model organisms for experimentation or data collection is also provided.

EMBRC-IT, which is now considered a 'joint research unit' (JRU), has set the following objectives: **attract and develop public-private collaborations (eg by creating a national index of scientific services for the marine community, and opening this catalogue to the EU; supporting efficient and coordinated technology transfer); improve fundraising capacity (eg EU and regional grants); and increase research capacity for associate partners (eg foster scientific collaborations and interactions, create favourable 'access conditions' for associate partner, improve opportunities for co-authorship and interdisciplinary collaboration).**



## 2021 EMBRC-IT highlights

- Set up the NEW EMBRC-IT Joint Research Unit (JRU), with significantly enlarged partnership, reaching a critical mass at national level, enriched by private entities. Thanks to this enlargement, the Italian contribution to the RI at European level will be greater, as it will be able to offer a larger portfolio of access to ecosystems, technological services, and expertise, as well as opportunities for collaboration and technology transfer<sup>14</sup>.
- The new enlarged EMBRC-IT JRU Agreement was signed on October 5th, 2021 by 16 members: 8 universities, 4 public research bodies/institutes, 1 national agency, 1 national technological cluster, 1 interuniversity consortium, 1 zooprophyllactic Institute
- The enlarged EMBRC-IT held its kick-off meeting on December 10th, 2021; the General Assembly and Executive Committee were formally established
- A census and evaluation of the services to be offered by the new EMBRC-IT JRU will be performed in 2022 defining qualitative and quantitative standards



*Offshore Aqua Alta experimental tower, Venezia. © CNR ISMAR Venice.*

*© RIMAR\_Dipartimento*

<sup>14</sup> In order to identify entities interested in joining the JRU, SZN sent invitations to all major marine research institutes and universities with marine biological departments in Italy.

# EMBRC Norway

EMBRC-Norway offers access to diverse marine ecosystems and organisms and to a broad range of research facilities spread along the Norwegian coast, including Arctic and fjord environments. The focus of the infrastructure is on facilities and equipment that allow experimental studies under controlled or semi-controlled conditions. Upgrades and development are ongoing in order to accommodate testing on organism responses to change under close-to-nature conditions. The node also provides optimised facilities for basic and applied research on fish and invertebrates species relevant for aquaculture and fisheries.



## 2021 EMBRC-NO highlights

- The two EMBRC Norway Liaison Officers (including one who doubles as the Communications Working Group representative) visited the EMBRC HQ office the week of November 15th to meet with colleagues and discuss various strategic issues; they also visited EMBRC France partner Station Biologique de Roscoff
- Contributed to communications campaigns including Model Organism of the Month (contributing a piece on sea lice) and the featured service campaign (highlighting EMBRC Norway's sea lice facilities and research capacity)
- Partner University of Bergen (UiB) participated in the IMBRSea network International Master in Marine Biological Resources, which is supported by EMBRC
- EMO BON sampling was initiated at the University of Tromsø (UiT)
- The Institute of Marine Research neared completion of building the infrastructures included in EMBRC
- Partner University of Tromsø (UiT) took part in the MASTS webinar series, with a lecture on 'Marine Environmental DNA in the Anthropocene' (see Communications for more information)



EMO BON sampling in Tromsø.  
©University of Bergen



EMBRC-NO visits Paris HQ.  
©University of Bergen

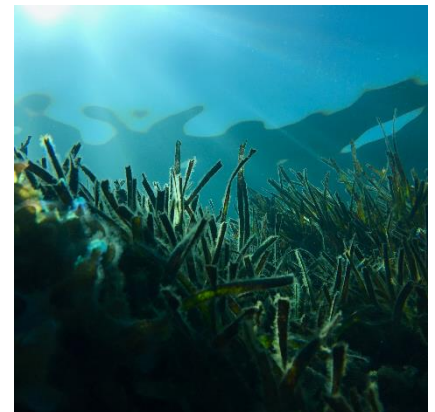
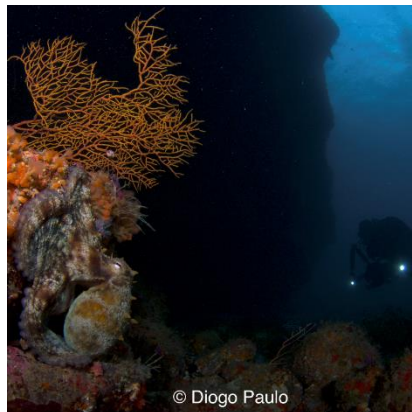
# EMBRC Portugal

EMBRC Portugal is composed of four operators, the Interdisciplinary Centre for Marine and Environmental Research (CIIMAR, Porto), the Institute of Marine Research (IMAR, Azores), the Coimbra Algal Collection (CAOL, Coimbra), coordinated by the Algarve Centre of Marine Sciences (CCMAR, Faro) and provides access to marine ecosystems in the Atlantic (marshes and estuaries, sandy and rocky shores, sea mounts and deep sea) using boats, diving and remote operation. A variety of research can be supported through systems to maintain marine organisms, bioinformatics, chemical and structural platforms, biodiscovery pipelines, imaging, cell culture, bioreactor and other facilities.



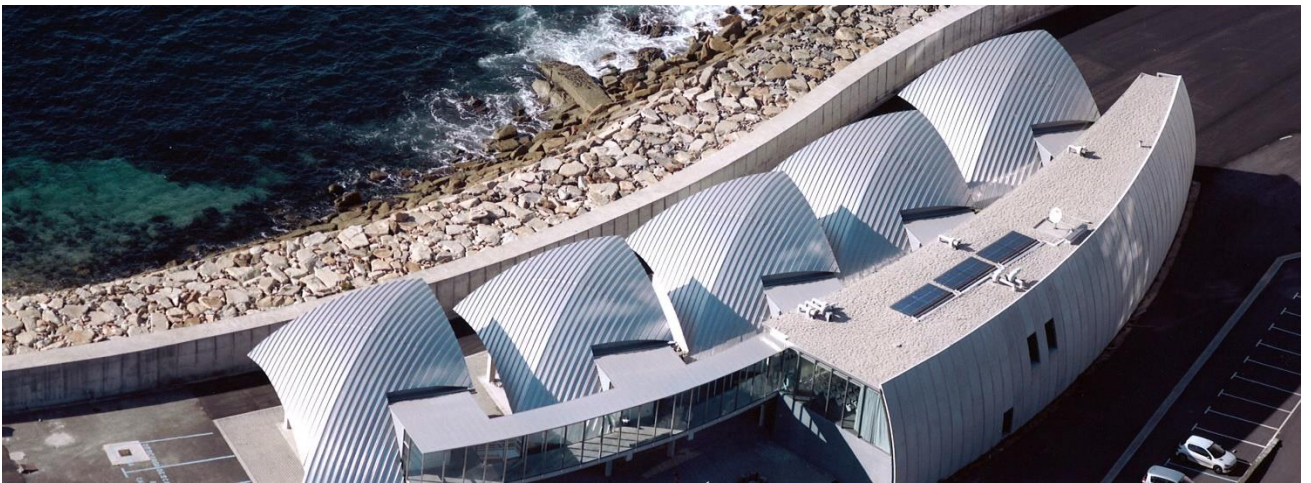
## 2021 EMBRC-PT highlights

- Participated in ASSEMBLE Plus, RI-VIS, EOSC-life and AQUAEXCEL2020 Horizon 2020 projects
- Organised the ASSEMBLE Plus conference in January 2021
- Contributed a featured service article for the EMBRC website on the Ramalhete Marine Station (CCMAR) and an article about seahorses for the Marine Organism of the Month campaign
- EMBRC Portugal's Communications Manager, in collaboration with the EMBRC (ERIC) Communications Officer, played a lead role in organising a training series on marketing and communications, and writing two extensive communications guideline documents for international collaboration (in Latin America and African countries) for the RI-VIS project
- Filmed facilities at CCMAR for EMBRC's first-ever 'virtual tour' (see Training above) and developed guidelines for the scaling up of the tours to other marine stations
- Participated in EMO BON sampling campaigns



# EMBRC Spain

In 2021, the Spanish Bank of Algae of the University of Las Palmas de Gran Canaria was incorporated as the third operator of EMBRC Spain (or EMBRC-ES). This increases access to the special marine ecosystems in the Canary Islands, expanding the habitat coverage of EMBRC to the subtropics in the southernmost point of Europe in front of the African coast. This also complements the access provided by the two founding operators of EMBRC-ES that are placed in the North of the Iberian Peninsula, providing access to the Galician rias (ECIMAT-UVIGO) and the pristine and anthropogenised estuaries in the southern Bay of Biscay (PiE-UPV/EHU). The three Spanish operators are active partners in fostering the creation of active and dynamic Regional Blue Innovation ecosystems in their respective regions in accordance with the regional smart specialisation strategies.



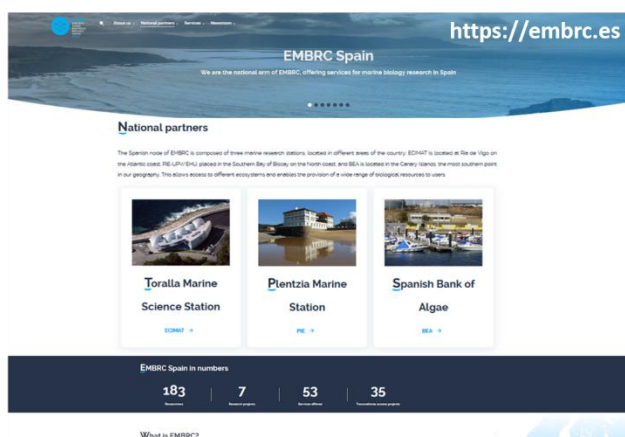
EMBRC-ES provides access to estuarine and coastal marine habitats (water column, soft sediment, rocky shores and artificial hard substrates) and to marine biological resources in the collections and environmental specimen biobanks in its operator stations. It offers a wide range of experimental facilities for ecological and aquaculture research, including climate-controlled rooms and micro- and mesocosms for invertebrate, fish, and microalgae culture. The Spanish operators offer equipment and services to study climate-change related and (eco)toxicological issues. An integrated One-Health marine laboratory, aquaculture, analytical chemistry, and platforms for molecular biology, histological, advanced microscopy and image analysis are available as well.





## 2021 EMBRC-ES highlights

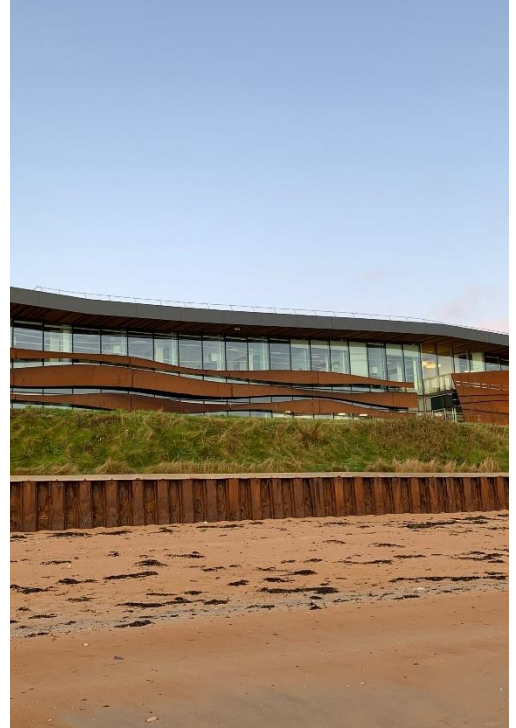
- Participated in the H2020 projects ASSEMBLE Plus, EOSC-Life, AtlantECO and ERIC Forum
- Incorporated the Spanish Bank of Algae of the University of Las Palmas de Gran Canaria as the third operator of EMBRC-ES through an agreement signed by the three universities forming EMBRC-ES
- ECIMAT-UVigo successfully led the Interreg EBB project that finished in 2021 providing material and standard operating procedures for the provision of marine genetic resources in compliance with national and international ABS regulations within the EMBRC context
- Launched the Spanish node webpage: <https://embrc.es/>
- EMBRC-ES organised, together with the Spanish Ministry of Science and Innovation, the first meeting of the Spanish ESFRI roadmap infrastructures (ES-RI-Forum)
- EMBRC-ES members actively participated in the activities of the EMBRC ABS, Access and Communication Working Groups
- Contributed to EMBRC news campaigns with the authoring of 28 biographies of marine scientists for 'Marine Scientist Monday' and one featured service article
- Incorporation of a EMBRC-ES team member in the international 'DSI Scientific network'
- The operator PiE-UPV/EHU incorporated new equipment and services in its offer: a mobile laboratory for collection and processing of samples in the intertidal zone, sample search of the [Biscay Bay Environmental Specimen Bank](#), and a strain search portal of the Basque Microalgae Culture Collection ([see here](#))
- The operator ECIMAT-UVIGO secured funding to incorporate new equipment and services in its offer: a new ship for oceanographic research with regional range, an Isotopic Relationships Mass Spectrometer for isotope analysis, a multibeam GeoSwath and an automatic fish feeding system
- ECIMAT-UVIGO and PiE-UPV/EHU participated in the EMO BON initiative with one sample location each
- EMBRC-ES offered access to 6 scientists at PiE-UPV/EHU and 3 scientists at ECIMAT through the EMBRC-led Assemble Plus project



# EMBRC UK

EMBRC-UK consists of six institutions: Marine Scotland Science (Scottish Government Agency); Scottish Association for Marine Science (independent marine science institute); Scottish Oceans Institute (University of St. Andrews); Marine Biological Association (independent marine research institute); British Antarctic Survey (UK research & Innovation – Natural Environment Research Council); and MASTS (Marine Alliance for Science & Technology for Scotland).

Through its partners, EMBRC UK can provide access to a multitude of ecosystems, habitats and species around the UK – from the English Channel to the southern and northern parts of the North Sea as well as to the west coast of Scotland, into the north east Atlantic Ocean. It can also provide remote sampling support from polar regions. The partnership provides access to expertise and specialist facilities for marine biological research including microbial collections, a seal pool, flying and diving robots, boat access, well-equipped laboratories and aquaria, long-term datasets and more.



## 2021 EMBRC-UK highlights

- Participated in ASSEMBLE Plus programme (SAMS, BAS)
- SAMS organised a training session on filmmaking for the EMBRC Communications Working Group on 1 June 2021
- Contributed on a featured service article for the EMBRC website on the Culture Collection of Algae and Protozoa (CCAP) at SAMS (which left EMBRC end December 2021)



*Aerial view: The Scottish Association for Marine Science, Oban, west coast of Scotland © SAMS*



*Laboratory: The Culture Collection of Algae and Protozoa © SAMS*

# Partnerships



**Nicolas Pade**

**Executive Director**

## EMBRC membership

In 2021, EMBRC set the stage to welcome its 10th member country, the Kingdom of Sweden, which officially joined early 2022. This is a particularly momentous development as Sweden was one of the countries which helped to establish EMBRC on the ESFRI Roadmap. Moreover, many of our partner institutions have long running collaborations and ties with well-known Swedish institutions, such as the Kristineberg and Tjärnö Marine Stations (University of Göteborg). Sweden adds seven new institutions to EMBRC, finally opening access to research in Skagerrak and the Baltic Sea, as well as excellent capabilities in ecology and environmental science.

## Bridging biological fields

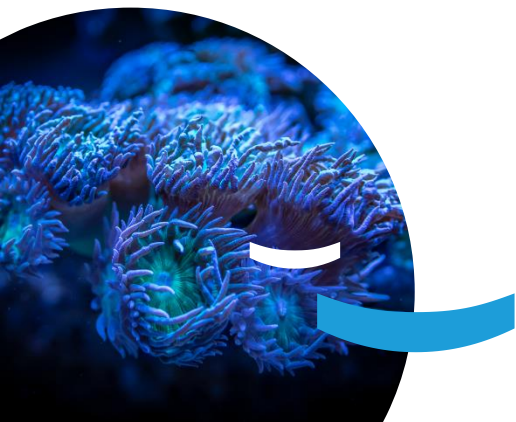


EMBRC Sweden. ©Matthias Obst



EMBRC Sweden. ©S Green, 2001

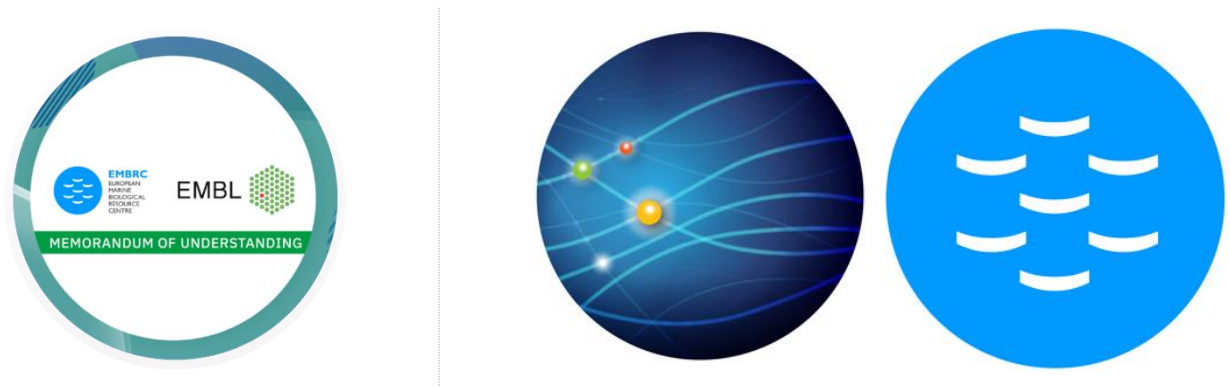
On December 31st, two EMBRC UK partners (SAMS and NERC BAS) left the UK node. Despite their departure, they will continue to be involved in ongoing projects such as ASSEMBLE Plus.



# Collaborations and networking

## Bridging biological fields

As an RI, EMBRC works to connect initiatives, projects, and communities across marine biological science, strengthening the community as a whole and creating new opportunities for excellent science. Given the rich diversity of marine life, marine biology has untapped potential to advance many aspects of biology. Part of EMBRC's mission is to enable marine biology's contribution to biology as a whole by building relationships across domains and disciplines. An excellent example of this commitment is the MoU EMBRC signed with EMBL in 2021. Beyond facilitating joint activities between EMBL and EMBRC's partner scientists, the collaboration agreement will facilitate EMBL's access to marine biodiversity, sampling facilities and techniques, and experimental facilities for its field campaigns.



Within our own field, we also became more involved with the EuroMarine network in 2021. EuroMarine is a member-based, interdisciplinary, collaborative network of European marine organisations and research institutes.

In particular, as noted in the 'EMBRC team' section above, we took on the role of its secretariat (based at our HQ office in Paris), and participated in a joint call to fund services for early career researchers. We hope that

this partnership will strengthen and increase interactions between the two organisations, seeing as EuroMarine represents an important part of EMBRC's user community.

## Initiatives with partners outside Europe

Beyond Europe, in 2021, EMBRC ran a pilot project, financed by the H2020 project RI-VIS to support bioprospecting at the University of Western Cape (see Services, sub-section Bioprospecting, above). EMBRC Portugal contributed with support on chemical structure elucidation. Further collaborations and discussions on deeper, long-term collaboration are planned for 2022. Also in South Africa, a discussion on collaboration with the South African Environmental Observation Network (SAEON) was initiated in 2021. Also during the year, EMBRC shared the EMO BON protocols for genomic observation and invited the Coastal SAEON node to participate in Ocean Sampling Day (OSD) and the Atlantic OSD as part of the H2020 AtlantECO project. A similar conversation took place with the Australian Integrated Marine Observation System (IMOS), with an in-person meeting planned for 2022 to discuss collaboration on genomic observation methods.



UNIVERSITY of the  
WESTERN CAPE

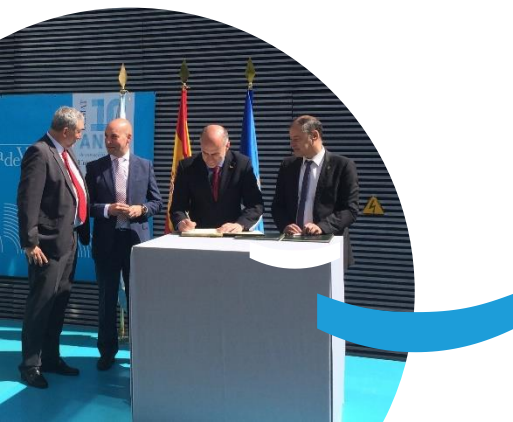
Also in 2021, Japan expressed interest in working with EMBRC to support the development of a national initiative to set up a Japanese research infrastructure on marine biological resources. Although the project was unsuccessful, dialogue continued afterwards, focusing on the sharing of Japan's *Ciona robusta* model organism for distribution in Europe; this would include making available for the users, both laboratory-reared wild types and transgenic lines, as well as the related genome resource. It is hoped that this initiative would lead to further scientific collaboration between Europe and Japan.

## EMO BON partnerships

EMO BON also opened pathways for further international collaboration. In 2021, EMBRC set up the genomic observatory according to international best practices and standards, mimicking the rigorous set-ups of oceanographic platforms. As of end 2021, this 'best-practice observatory' included 16 EMBRC stations located in nine countries.

Following its launch in June 2021, EMO BON quickly became a source of interest within the ocean observation domain. This led to discussions with the Marine Biodiversity Observation Network (MBON) on potential collaboration and interest from the Partnership for Observation of the Global Ocean (POGO) to link with our initiative. These discussions ultimately led to an invitation to submit

EMO BON to the OBON UN Decade programme to become an endorsed project of the UN Decade of the Ocean (application to be submitted in 2022).

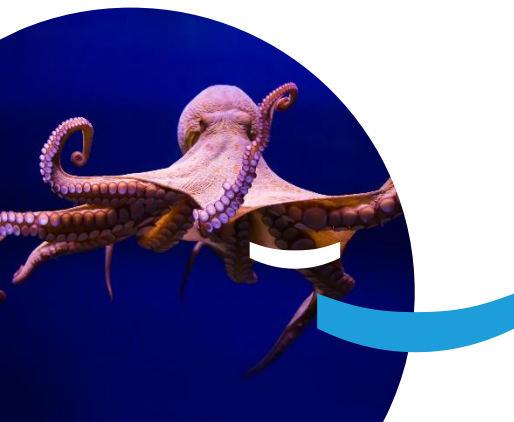


## RI community

EMBRC continued to be an active participant in the vibrant life science RI (LS-RI) and environmental science RI (ENVRI) communities. Within LS-RI, EMBRC worked closely with EuroBioImaging to identify areas of common interest, in particular around training, capacity building, and mutual promotion. Ties with EU-OPENSSCREEN were also strengthened in 2021, as we continued to explore areas of collaboration. The possibility to link EMBRC's capabilities in bioprospecting to EU-OPENSSCREEN's compound libraries was explored as a possible means to provide a new source of novel compounds for EU-OPENSSCREEN on the one hand, and a source of added value for EMBRC on the other hand. Ties were also explored with ELIXIR to see how EMBRC data can integrate standards to flow into relevant databases.

Within the ENVRI community, EMBRC continued to work with a core set of RIs (Euro-ARGO ERIC, EMSO ERIC, LifeWatch ERIC) to form a strong marine component. In particular, we explored how RIs can become integrated parts of Europe's observation networks, helping to provide a core component of standardised, long-term funded observations. In 2021, EMBRC also explored potential ties with eLTER, to benefit the long-term observations carried out by many EMBRC partners, creating links between terrestrial and marine biodiversity observation, and sharing standard operating procedures and protocols.

As a whole, the RI community was very happy to see the return of calls for Transnational Access in Horizon Europe. Subsequently, 2021 was busy with the drafting of project proposals in diverse areas, from cancer and infectious diseases to agro-ecological transitioning (See project section for further details). If successful, this will see EMBRC finally bringing the potential of marine biological resources to health issues in Europe.



# Governance



**Lucie Salvaudon**

**General Assembly Secretary**

## General Assembly

EMBRC is governed by the General Assembly (GA), which includes two representatives from each EMBRC member country. The GA makes decisions regarding EMBRC's strategy, governance, and scientific development. In 2021, the GA was chaired by Prof David M. Paterson (Marine Alliance for Science and Technology for Scotland, MASTS, UK) with Adelino Canário (Centre of Marine Science, CCMAR, Portugal) and Eric Guittet (*Ministère de l'Enseignement Supérieur, de la Recherche et de l'Innovation, MESRI, France*) acting as Vice-chairs.

In 2021, the GA met once virtually, from 19-20 May and the second time in-person in Paris from 24-25 November. The GA adopted the EMBRC-ERIC Rules of Operations and Service level Agreement template, it approved the 2021 annual and financial reports and the Work Plan for 2022. The GA also approved the addition of Sweden as a new member of EMBRC.

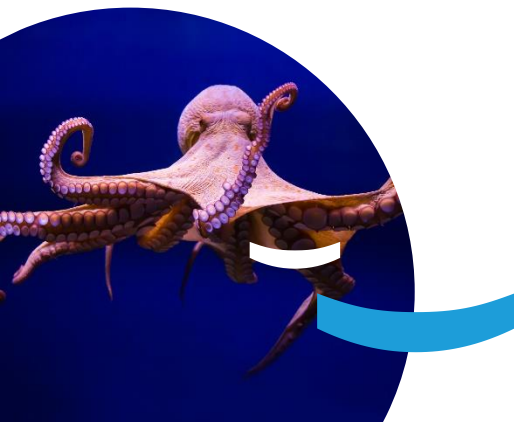











## RI community

EMBRC continued to be an active participant in the vibrant life science RI (LS-RI) and environmental science RI (ENVRI) communities. Within LS-RI, EMBRC worked closely with EuroBioImaging to identify areas of common interest, in particular around training, capacity building, and mutual promotion. Ties with EU-OPENSSCREEN were also strengthened in 2021, as we continued to explore areas of collaboration. The possibility to link EMBRC's capabilities in bioprospecting to EU-OPENSSCREEN's compound libraries was explored as a possible means to provide a new source of novel compounds for EU-OPENSSCREEN on the one hand, and a source of added value for EMBRC on the other hand. Ties were also explored with ELIXIR to see how EMBRC data can integrate standards to flow into relevant databases.

Within the ENVRI community, EMBRC continued to work with a core set of RIs (Euro-ARGO ERIC, EMSO ERIC, LifeWatch ERIC) to form a strong marine component. In particular, we explored how RIs can become integrated parts of Europe's observation networks, helping to provide a core component of standardised, long-term funded observations. In 2021, EMBRC also explored potential ties with eLTER, to benefit the long-term observations carried out by many EMBRC partners, creating links between terrestrial and marine biodiversity observation, and sharing standard operating procedures and protocols.

As a whole, the RI community was very happy to see the return of calls for Transnational Access in Horizon Europe. Subsequently, 2021 was busy with the drafting of project proposals in diverse areas, from cancer and infectious diseases to agro-ecological transitioning (See project section for further details). If successful, this will see EMBRC finally bringing the potential of marine biological resources to health issues in Europe.



Country	Gov. representative	Sci. representative
 France	Eric Guittet (GA Vice-chair)	Bertrand Meyer
 Belgium	Koen Lefever Didier Flagothier (substitute)	Gert Verreet
 Greece	Stylios Kastrinakis Maria Gkizeli (alternate)	Antonis Magoulas Panagiotis Kasapidis (alternate)
 Israel	Moshe Ben Sassoon Shani Edri and Barak Gateno (alternates)	Simon Berkowicz
 Italy	Grazia Pavoncello	Roberto Danovaro Marco Borra (alternate)
 Norway	Christine Daae Olseng	Amund Maage
 Portugal	Marta Abrantes	Adelino Canario (GA Vice-chair)
 Spain	Inmaculada Figueroa Rojas	José Manuel García Estevez
 UK	Ian Davies	David Paterson (GA chair)



EMBRC General Assembly hybrid meeting in Paris (24-25 November). ©EMBRC.

# Committee of Nodes



## Jan Vanaverbeke

**Senior Scientist at the Royal Belgian Institute for Natural Sciences, EMBRC Belgium CoN representative**

This committee serves as a link between EMBRC HQ and the national partners, ensuring that decisions made by the GA are implemented at national level. It also provides advice on development and technical issues.

The Committee of Nodes (CoN) had seven digital and one hybrid meeting in 2022. COVID impacted the activities of the Committee marginally, as it had switched to regular virtual meetings already before the outbreak.

### Major activities and accomplishments included:

- Analysis of the EMBRC Technical and Scientific Description, as input for the Work Programme 2022 and priorities for the next budgetary cycle
- Mid-term analysis of the EMBRC Scientific Strategy 2020-2023, as input for the Work Programme 2022 and priorities for the next budgetary cycle
- Support for the kick-off of EMO BON
- Sharing of best practices to strengthen EMBRC governance at node level












*CoN members enjoy a meal together during the 31st CoN Meeting in Faro, Portugal (28-29 September 2021).*

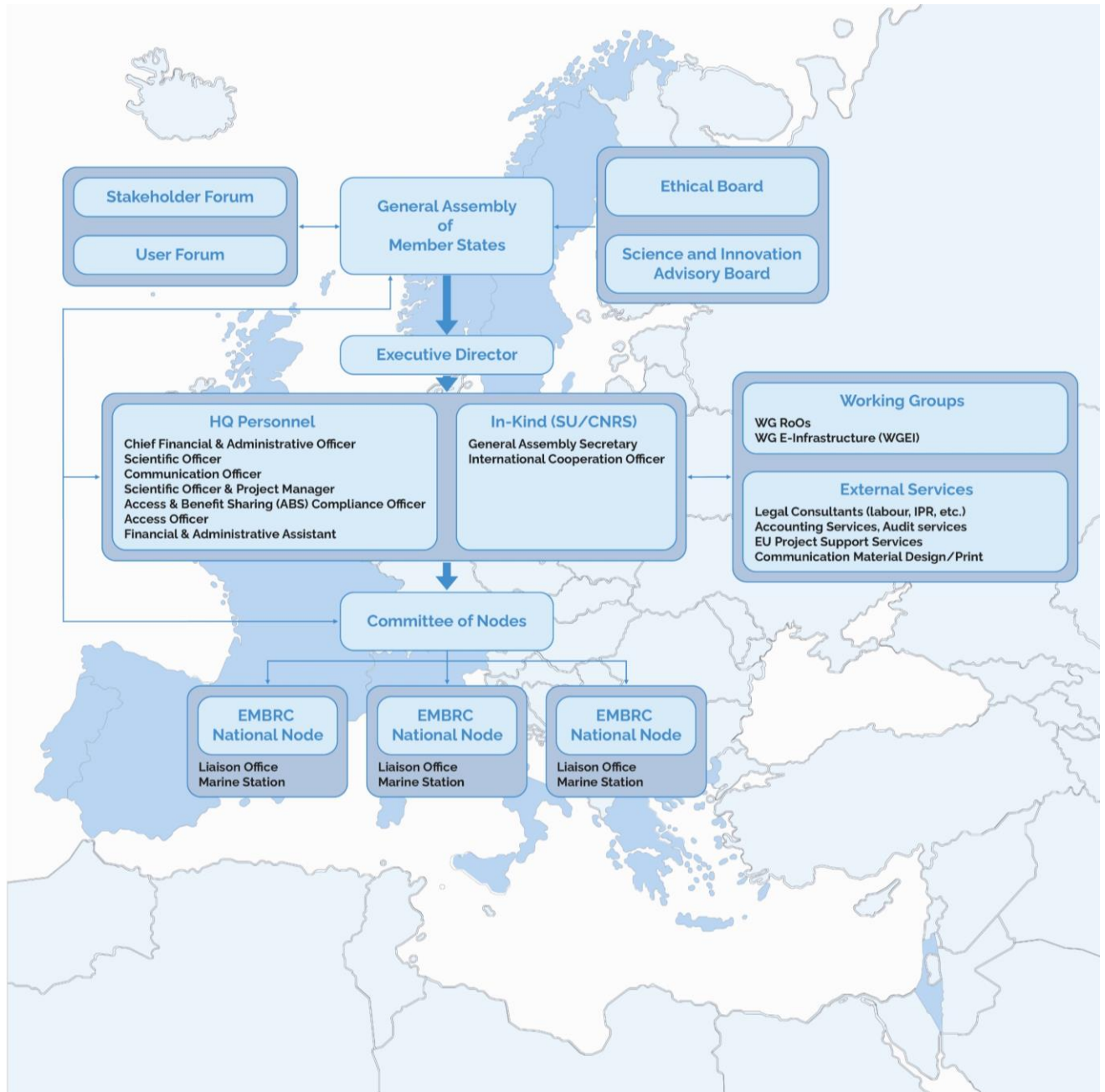


*CoN members hard at work during the 31st meeting in Faro*

## EMBRC Committee of Nodes members

	<b>Jan Vanaverbeke</b>	Royal Belgian Institute of Natural Sciences	RBINS
	<b>Sidonie Gras</b>	European Marine Biological Resource Centre	EMBRC
	<b>Nicolas Pade</b>	European Marine Biological Resource Centre	EMBRC
	<b>Bernard Kloareg</b>	Station Biologique de Roscoff	SBR
	<b>Georgios Kotoulas</b>	Institute of Marine Biology, Biotechnology and Aquaculture	HCMR-IMBBC
	<b>Jaap van Rijn</b>	The Hebrew University of Jerusalem - Interuniversity Institute for Marine Sciences	HUJI
	<b>Wiebe Kooistra</b>	Stazione Zoologica Anton Dohrn	SZN
	<b>Tatiana Tsagaraki</b>	University of Bergen	UiB
	<b>Daniela Fazenda</b>	Centro de Ciências do Mar	CCMAR
	<b>Deborah Power</b>	Centro de Ciências do Mar	CCMAR
	<b>Ibon Cancio</b>	Plentzia Marine Station	PIE
	<b>Axel Miller</b>	Scottish Association for Marine Science	SAMS

# EMBRC-ERIC organigram



# Financial report



**Alexandra Vasic**

Chief Financial & Administrative Officer



**Guillaume Duspara**

Financial & Administrative Assistant

## Income

EMBRC is financed by nine member countries that contribute in two different ways: through cash contributions and in-kind contributions. In 2021, in alignment with the budget voted by the General Assembly, the contributions from the member countries amounted to:

Membership contributions	2021
Membership fees (amounts in euros)	
France	€ 103 492
UK	€ 106 985
Italy	€ 91 484
Spain	€ 79 279
Israel	€ 69 517
Belgium	€ 74 777
Norway	€ 93 602
Greece	€ 60 988
Portugal	€ 61 068

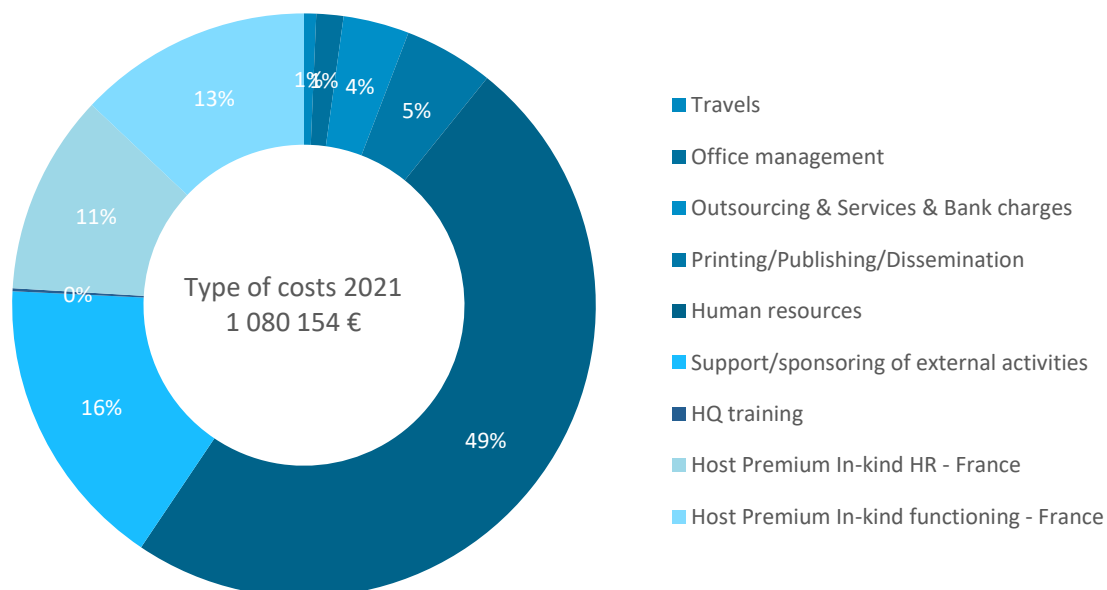
Host premium contribution	
Host premium cash - France	€ 300 000
Host premium in-kind - France	€ 260 000
Project income	€ 145 021
Other	€ 1 081
VAT Refund	€ 20 772
<b>Total contributions</b>	<b>€ 1 468 066</b>

# Expenses

EMBRC's finances are audited every year according to French law, where the headquarters has its statutory seat. The operational costs for the year 2021 were distributed as follows:

Type of costs	2021
Human resources	€ 525 250
Travels	€ 7 275
Office management	€ 16 206
Outsourcing & Services & Bank charges	€ 39 476
Printing/Publishing/Dissemination	€ 53 694
Support/sponsoring of external activities	€ 176 454
HQ training	€ 1 799
<b>Host premium contribution</b>	
Host premium in-kind HR - France	€ 120 000
Host premium in-kind functioning - France	€ 140 000
<b>Total expenses</b>	<b>€ 1 080 154</b>

## Pie diagram of main expenditures in 2021



In 2021, EMBRC costs totalled 1,080,154 euros, nearly half of which were allocated to human resources (525,250€ or 48.63% of costs), in line with the previous year's expenses. Travel costs were slightly lower than 2020 (7,275€ in 2021 vs. 12,793€ in 2020), which can be attributed to the ongoing COVID pandemic. There was a notable increase in support / sponsoring of external activities compared to the previous year, however, amounting to 176,454€ in 2021 vs. 83,158€ in 2020; this can be explained by the launch of EMO BON (see Services above).

## External funding sources

European project funding is only used to carry out projects in which EMBRC is involved in. In 2021, this funding was as follows:

Project	2021
ERIC FORUM	
Direct personnel costs	€ 749
Other direct costs	€ 0
<b>Total</b>	<b>€ 749</b>

EOOSC-LIFE	
Direct personnel costs	€ 55 380
Other direct costs	€ 0
<b>Total</b>	<b>€ 55 380</b>

AtlantECO	
Direct personnel costs	€ 316
Other direct costs	€ 0
<b>Total</b>	<b>€ 316</b>

For all projects	
Direct personnel costs	€122 620
Other direct costs	€22 400
<b>Total</b>	<b>€145 020</b>

Project	2021
RI-VIS	
Direct personnel costs	€ 14 129
Other direct costs	€ 22 400
<b>Total</b>	<b>€ 36 529</b>

ASSEMBLE Plus	
Direct personnel costs	€ 49 653
Other direct costs	€ 0
<b>Total</b>	<b>€ 49 653</b>

DOORS	
Direct personnel costs	€ 2 393
Other direct costs	€ 0
<b>Total</b>	<b>€ 2 393</b>





# Publications

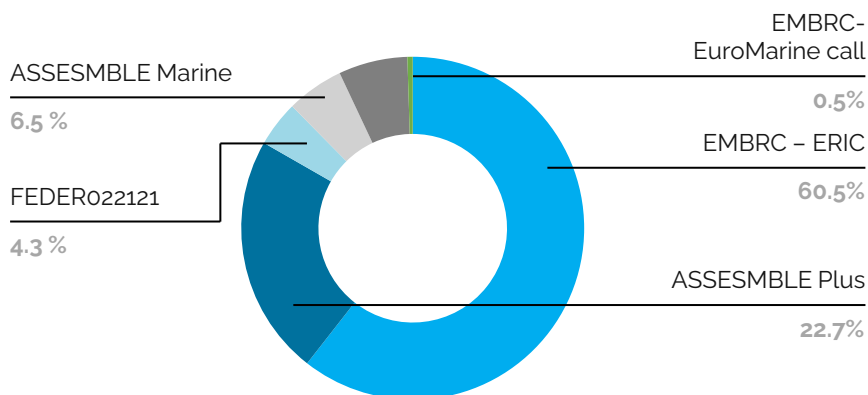


**Davide Di Cioccio**  
Access Officer

## Overview

In 2021, EMBRC continued to support and enable research projects and saw an increasing number of publications, with a total of 213 publications, or a 45.5% increase from the previous year. This increase can be attributed, in part, to several research projects acknowledging the use of EMBRC facilities and services in their publications (Fig. 12).

### Scientific outcomes acknowledging EMBRC or its related projects

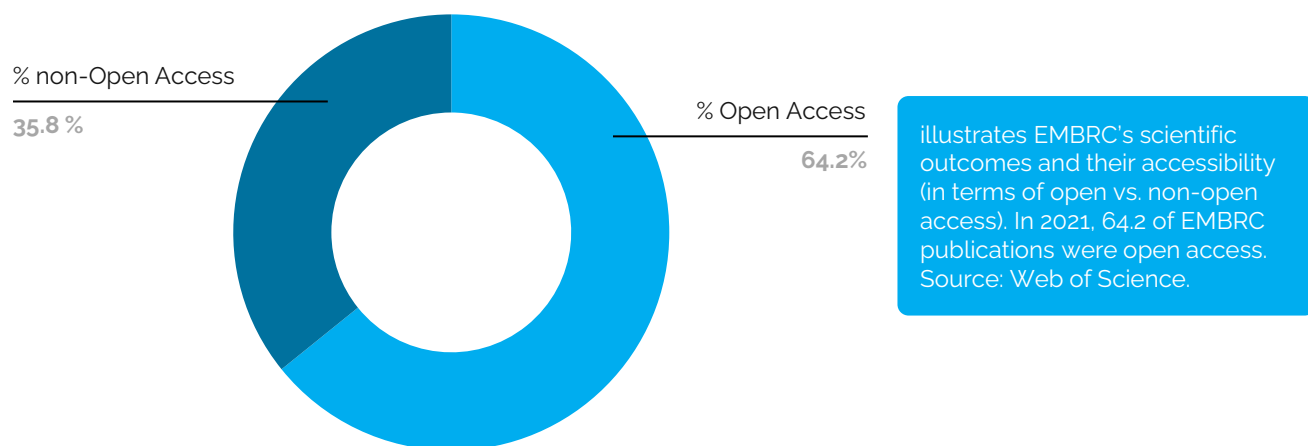


Source: Web of Sciences with data deduplicated from other publication databases. Publications from the projects ASSEMBLE Marine and ASSEMBLE Plus may include in few cases outcomes generated in institutes not part of EMBRC. In 2021, 213 publications acknowledged EMBRC or its projects, a sharp increase (45.5%) compared to 2020.

The ASSEMBLE Plus project contributed to increasing the 'corpus' of scientific outcomes in 2021, thanks to publications coming from Joint Research Activities and the Transnational Access programme (31 publications, 19.5%). Other completed projects (ASSEMBLE Marine and European Marine Biological Research Infrastructure Cluster, EMBRIC) also continued to generate scientific outcomes, in some cases years after the project's conclusion.

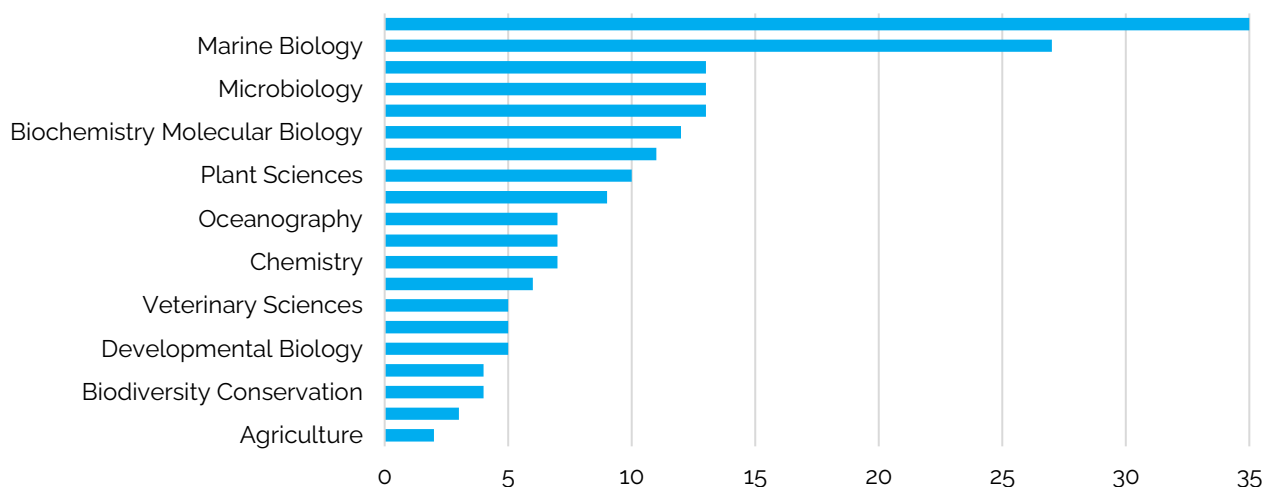
The majority of scientific outcomes was published in Open Access (64.2%), marking only a slight decrease from the previous year (-7.6%) (Fig. 13). EMBRC encourages its users to make their scientific outcomes available in an open and FAIR format, following a growing trend across scientific domains.

### Open access and non-open access publications in 2021



The top 20 research areas of journals where scientific outcomes were published in 2021 (Fig. 14) indicates a strong presence in the environmental sciences domain (environmental sciences – ecology, marine biology, zoology and microbiology). Marine biology is naturally the main research area. Other research areas such as biotechnology – applied microbiology, biochemistry, science technology, plant science, fall in the domain of applied sciences.

### Top 10 research areas of scientific outcomes published in 2021



Source: Web of Science. Elaboration: EMBRC HQ.

## Collaboration with OpenAIRE to feature EMBRC research outcomes

In December 2021, EMBRC signed a Memorandum of Understanding with OpenAIRE . The aim of the agreement is to develop a dashboard that will collect and make public all the research outcomes of EMBRC, from publications to datasets.

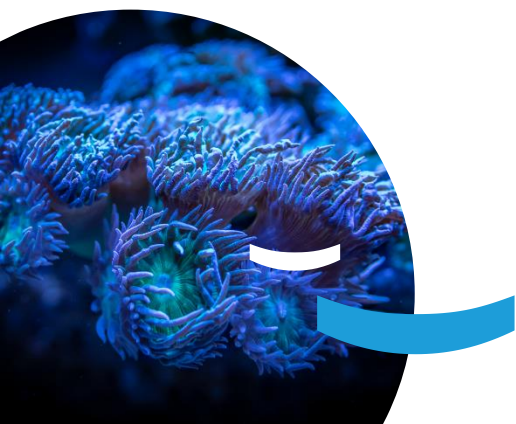
This dashboard will give visibility to all the EMBRC research 'products' (publications, datasets, software, other research products). The publication dashboard will be incorporated into the EMBRC website in 2022. This will be a huge improvement in providing visibility to all EMBRC publications, which, until now, have been hosted, in part, on the ASSEMBLE Plus website (ASSEMBLE-related publications only). Thanks to an algorithm, the OpenAIRE system will add relevant articles to our dashboard and offer charts of performance stats (number of publications and citations over the years, % of Open Access publications, etc.).

## Publications in 2021

For the list of EMBRC-related publications in 2021, which includes articles (co-)authored by EMBRC and/or related to an EMBRC-coordinated project or resulting from EMBRC services (and acknowledging EMBRC), see here:

<https://embrc.eu/2021-embrc-publication-list>

<sup>15</sup>The Open AIRE project is sustained by the European Union's Horizon 2020 Research and Innovation programme under grant agreements no.s 777541 and 101017452.



# Annex

## List of EMBRC operators and sites

The table below lists all EMBRC participating institutions ('operators' and 'sites', ie marine stations/institutes).

Site	Site abbreviation	Operator	Member country
<b>Ghent University</b>	UGENT	UGENT	<b>Belgium</b>
<b>Flanders Marine Institute (Marine Station Ostend)</b>	VLIZ	VLIZ	
<b>Royal Belgian Institute of Natural Sciences</b>	RBINS	RBINS	
<b>University of Hasselt</b>	UHasselt	UHasselt	
<b>Katholieke Universiteit Leuven</b>	KULeuven	KULeuven	
<b>Toralla Marine Science Station - Vigo University Marine Research Centre</b>	ECIMAT-UVIGO	UVIGO	<b>Spain</b>
<b>Plentzia Marine Station</b>	PIE-UPV/EHU	UPV/EHU	<b>France</b>
<b>Institut de la Mer de Villefranche</b>	IMEV	SU-CNRS	
<b>Observatoire Océanologique de Banyuls sur Mer</b>	OOB	SU-CNRS	
<b>Station Biologique de Roscoff</b>	SBR	SU-CNRS	
<b>Sorbonne University (Paris)</b>	SU	SU	<b>Greece</b>
<b>Institute of Marine Biology, Biotechnology and Aquaculture, Hellenic Centre for Marine Research</b>	HCMR-IMBBC	HCMR	
<b>Interuniversity Institute for Marine Sciences in Eilat</b>	IUI	Hebrew University of Jerusalem (HUJI)	<b>Israel</b>
<b>Stazione Zoologica Anton Dohrn</b>	SZN	SZN	<b>Italy</b>
<b>Benthic Ecology Centre</b>	SZN-BEC	SZN	
<b>Marine Turtles Research Center</b>	SZN-MTRC	SZN	
<b>Università di Padova - Hydrobiological Station 'U. D'Ancona'</b>	CONISMA-Chioggia	CoNISMa	
<b>Università di Camerino – URDIS</b>	CONISMA-Camerino	CoNISMa	
<b>Università di Urbino</b>	CONISMA-Urbino	CoNISMa	
<b>Istituto per lo studio degli impatti Antropici e Sostenibilità in ambiente marino - Oristano</b>	CNR-IAS-O	CNR-IAS	
<b>Istituto per lo studio degli impatti Antropici e Sostenibilità in ambiente marino - Capo Granitola</b>	CNR-IAS-CG	CNR-IAS	
<b>Istituto per le Risorse Biologiche e le Biotecnologie Marine - Messina</b>	CNR-IRBIM-M	CNR-IRBIM	

Site	Site abbreviation	Operator	member country
<i>Istituto per le Risorse Biologiche e le Biotecnologie Marine - Lesina</i>	CNR-IRBIM-L	CNR-IRBIM	Italy
<i>Istituto di Scienze Marine - Venezia</i>	CNR-ISMAR	CNR-ISMAR	
National Institute of Oceanography and Experimental Geophysics	OGS	OGS	
Institute of Marine Research - Austevoll Research Station	IMR-ARS	IMR	Norway
Institute of Marine Research - Marbank	IMR-M	IMR	
Norwegian Institute for Water Research	NIVA	NIVA	
Nofima	Nofima	Nofima	
Norwegian University of Science and Technology	NTNU	NTNU	
Sars International Centre for Marine Molecular Biology	UIB-SICMMB	UIB	
Marine Biological Station Espeland	UIB-MBSE	UIB	
Sea Lice Research Centre	UIB-SLRC	UIB	
The Arctic University of Norway - Tromsø Aquaculture Research Station	AUN-TARS	UIT	
The Arctic University of Norway - Bioprospecting	NFH	UIT	
University of Oslo	UO	UO	
Ramalhete Marine Station	CCMAR- Ramalhete	CCMAR	Portugal
Centre for Marine Sciences	CCMAR	CCMAR	
Interdisciplinary Centre of Marine and Environmental Research	CIIMAR	CIIMAR	
Institute of Marine Research	IMAR	IMAR	
Coimbra Collection of Algae	ACOI	ACOI	
The Marine Biological Association	MBA	MBA	United Kingdom
Marine Scotland Science	MSS	MSS	
Natural Environment Research Council – British Antarctic Survey	NERC-BAS	NERC	
Scottish Association for Marine Science	SAMS	SAMS	
Scottish Oceans Institute	SOI	SOI	



# Acronyms

Acronym	Meaning
<b>ABS</b>	Access and Benefit-Sharing
<b>ACOI</b>	Coimbra Collection of Algae
<b>AGM</b>	Annual general meeting
<b>AORA</b>	Atlantic Ocean Research Alliance
<b>ASSEMBLE Plus</b>	Association of European Marine Biological Laboratories Expanded
<b>AUN-TARS</b>	UiT - The Arctic University of Norway - Tromsø Aquaculture Research Station
<b>BOON</b>	Biomolecular Ocean Observing Network (BOON)
<b>CBD</b>	Convention on Biological Diversity
<b>CCAP</b>	Culture Collection of Algae and Protozoa
<b>CCMAR</b>	Centre for Marine Sciences
<b>CCMAR-Ramalhete</b>	Centre for Marine Sciences - Ramalhete marine station
<b>CIIMAR</b>	Interdisciplinary Centre of Marine and Environmental Research
<b>CNR-IAS-CG</b>	<i>Istituto per lo studio degli impatti Antropici e Sostenibilità in ambiente marino - Capo Granitola</i>
<b>CNR-IAS-O</b>	<i>Istituto per lo studio degli impatti Antropici e Sostenibilità in ambiente marino - Oristano</i>
<b>CNR-IRBIM-L</b>	<i>Istituto per le Risorse Biologiche e le Biotecnologie Marine - Lesina</i>
<b>CNR-IRBIM-M</b>	<i>Istituto per le Risorse Biologiche e le Biotecnologie Marine - Messina</i>
<b>CNR-ISMAR</b>	<i>Istituto di Scienze Marine - Venezia</i>
<b>CNRS</b>	<i>Centre National de la Recherche Scientifique</i>
<b>CoN</b>	(EMBRC) Committee of Nodes
<b>CONISMA-Camerino</b>	<i>Università di Camerino - URDIS (San Benedetto del Tronto)</i>
<b>CONISMA-Chioggia</b>	<i>Università di Padova - Hydrobiological Station 'U. D'Ancona' (Chioggia)</i>
<b>CONISMA-Urbino</b>	<i>Università di Urbino</i>
<b>COP15</b>	Fifteenth meeting of the Conference of the Parties
<b>DOORS</b>	Developing an Optimal and Open Research Support system to unlock the potential for blue growth in the Black Sea (BS)

Acronym	Meaning
<b>DSI</b>	Digital sequence information
<b>ECIMAT-UVIGO</b>	Toralla Marine Science Station - Vigo University Marine Research Centre
<b>EDA</b>	Effect Directed Analysis
<b>EMBRC</b>	European Marine Biological Resource Centre
<b>EMBRIC</b>	European Marine Biological Research Infrastructure Cluster
<b>EMO BON</b>	European Marine Omics Biodiversity Observation Network
<b>ENVRI</b>	Environmental Research Infrastructures
<b>EOSC</b>	European Open Science Cloud
<b>ERC</b>	European Research Council
<b>ERIC</b>	European Research Infrastructure Consortium
<b>EuroGOOS</b>	European Global Ocean Observing System
<b>FAIR</b>	Findable, Accessible, Interoperable and Reusable
<b>GA</b>	(EMBRC) General Assembly
<b>GLOMICON</b>	Global Omics Observatory Network
<b>H2020</b>	Horizon 2020
<b>HCMR-IMBBC</b>	Institute of Marine Biology, Biotechnology and Aquaculture, Hellenic Centre for Marine Research
<b>HQ</b>	(EMBRC) Headquarters
<b>HR</b>	Human resources
<b>HUJI</b>	Hebrew University of Jerusalem
<b>ICOS</b>	Integrated Carbon Observation System
<b>IMAR</b>	Institute of Marine Research
<b>IMEV</b>	Institut de la Mer de Villefranche
<b>IMR-ARS</b>	Institute of Marine Research - Austevoll Research Station
<b>IMR-M</b>	Institute of Marine Research - Marbank
<b>IUI</b>	Interuniversity Institute for Marine Sciences in Eilat
<b>JRU</b>	(EMBRC Italy) Joint Research Unit
<b>KULeuven</b>	<i>Katholieke Universiteit Leuven</i>
<b>LS RI</b>	Life Science Research Infrastructure
<b>MBA</b>	The Marine Biological Association
<b>MSc</b>	Master of Science
<b>MSS</b>	Marine Scotland Science
<b>MUR</b>	(Italian) Ministry of the Universities and Research
<b>NERC-BAS</b>	Natural Environment Research Council – British Antarctic Survey
<b>NFH</b>	UiT - The Arctic University of Norway - Bioprospecting
<b>NGS</b>	Next generation sequencing (data)

Acronym	Meaning
<b>NIVA</b>	Norwegian Institute for Water Research
<b>Nofima</b>	Nofima
<b>NORCCA</b>	Norwegian Culture Collection of Algae
<b>NP</b>	Nagoya Protocol
<b>NTNU</b>	Norwegian University of Science and Technology
<b>OGS</b>	National Institute of Oceanography and Experimental Geophysics
<b>OOB</b>	<i>Observatoire Océanologique de Banyuls-sur-Mer</i>
<b>OSD</b>	Ocean Sampling Day
<b>PIE-UPV/EHU</b>	Plentzia Marine Station
<b>RBINS</b>	Royal Belgian Institute of Natural Sciences
<b>RI</b>	Research Infrastructure
<b>RoOS</b>	Rules of Operation
<b>SAMS</b>	Scottish Association for Marine Science
<b>SBR</b>	<i>Station Biologique de Roscoff</i>
<b>SDG</b>	Sustainable Development Goal
<b>SLA</b>	Service Level Agreement
<b>SOI</b>	Scottish Oceans Institute
<b>SU</b>	Sorbonne University (Paris)
<b>SWOT</b>	Strengths, weaknesses, opportunities, and threats
<b>SZN</b>	Stazione Zoologica Anton Dohrn
<b>SZN-BEC</b>	SZN - Benthic Ecology Centre
<b>SZN-MTRC</b>	SZN - Marine Turtles Research Center
<b>TNA</b>	Transnational access
<b>UGENT</b>	Ghent University
<b>UHasselt</b>	University of Hasselt
<b>UIB-MBSE</b>	UIB - Marine Biological Station Espegrend
<b>UIB-SICMMB</b>	UIB - Sars International Centre for Marine Molecular Biology
<b>UIB-SLRC</b>	UIB - Sea Lice Research Centre
<b>ULPGC</b>	University of Las Palmas de Gran Canaria
<b>UN</b>	United Nations
<b>UO</b>	University of Oslo
<b>USAID</b>	United States Agency for International Development
<b>VA</b>	Virtual access
<b>VAT</b>	Value-added tax
<b>VLIZ</b>	Flanders Marine Institute (Marine Station Ostend)



# Acknowledgements



EMBRC is grateful to all the individuals who contributed to this report, including at HQ and country level.

Image copyright information is selectively indicated in image captions. Photos have been provided by EMBRC member countries (partner sites/operators) or downloaded from image banks such as iStock. HQ staff pictures and images of the Sorbonne University campus, where EMBRC HQ is located, were taken by Anne Gozard.





