



## **Deliverable D 9.4**

# **Training information portal**

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Dissemination Level		
PU	Public	<b>X</b>
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

## Abstract

This deliverable 9.4 part of Work Package 9 explains how the Training and Knowledge Transfer activities in Work Package 9 had an impact on the overall implementation and success of the EMBRIC project. The goal was to focus trainings on current gaps in order to overcome obstacles currently hindering further uptake of marine biotechnology. Therefore, this work package was intended to reach both internal and external participants of the EMBRIC project.

# Table of Contents

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<b>1</b>	<b>ESFRI training rationale .....</b>	<b><u>44</u></b>
<b>2</b>	<b>Introduction.....</b>	<b><u>55</u></b>
<b>3</b>	<b>Analysis of the Knowledge Exchange WP (WP9) .....</b>	<b><u>66</u></b>
3.1	<b>Recommendations (Deliverable 9.1) .....</b>	<b><u>66</u></b>
3.2	<b>EMBRIC integrated training programme.....</b>	<b><u>88</u></b>
3.3	<b>Online training portal.....</b>	<b><u>99</u></b>
3.4	<b>Online training courses.....</b>	<b><u>1010</u></b>
<b>4</b>	<b>Cluster's training connectivity .....</b>	<b><u>1414</u></b>
4.1	<b>Dissemination channels.....</b>	<b><u>1414</u></b>
4.2	<b>Target audience .....</b>	<b><u>1515</u></b>
<b>5</b>	<b>Concluding recommendations for EMBRIC training .....</b>	<b><u>1919</u></b>
5.1	<b>Communication.....</b>	<b><u>1919</u></b>
5.2	<b>Quantitative metrics .....</b>	<b><u>1919</u></b>

## Glossary and abbreviations

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BSc:	Bachelor of Science
CDM:	Course Description Metadata
CPD:	Continuing Professional Development
CPMR:	Conference of peripheral maritime regions
EMB:	European Marine Board
EMBRC:	European Marine Biological Resource Centre
EMBRIC:	European Marine Biological Research Infrastructure Cluster
ENVRI+:	Cluster of ESFRI infrastructures in the field of environmental Sciences
EQF:	European Qualifications Framework
ERA-NET:	European Research Area Network
ESFRI:	European Strategy Forum on Research Infrastructures
HCB:	Human Capacity Building
IAP:	Integrating Activity Project
iframe:	A visual html browser window to display content from a third party website
ISB:	United Kingdom's Information Standards Board
ISCED:	International Standard Classification of Education
JPI:	Joint Project Initiative
KPI:	Key Performance Indicator
MEP:	Member of the European Parliament
MBT:	Marine Biotechnology ERA-NET
MLO:	Metadata for Learning Opportunities
MSc:	Master of Science
PhD:	Doctor of Philosophy
PHP:	Hypertext Pre-processor, scripting language designed for web development
RI:	Research Infrastructure, a site-specific cluster of research groups and tools that provide essential services for basic or applied research.
RItrain:	The Research Infrastructure Training Programme
UNESCO:	United Nations Educational, Scientific and Cultural organisation
WP:	Work package
XCRI-CAP:	eXchanging Course Related Information - Course Advertising Profile, is an information model to share information about courses

# 1 ESFRI training rationale

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The 2016 strategy report on research infrastructures<sup>1</sup> stipulated that advanced system of RIs are the most effective solution to provide state-of-the-art instruments and methods for performing research at a large scale. Most of the resources and knowledge that can be accessed by users of the RIs would not otherwise be available to the vast majority of researchers or simply not available at all. By strategically linking advanced education and training at RIs with, for instance, academic programmes and short courses as well as with “continuous professional development (CPD)” of technical staff one can have a greater number of highly skilled user-scientists and a greater number of more effective innovation experts. There is a danger that those RIs and Integrating Activity projects that put training to the fore are developed, implemented and operated in thematic isolation following the funding call topic descriptors and specific challenges they answer. As such there is a risk of fragmentation, lack of interoperability between them and parallel development of divergent solutions to similar problems. In order to avoid this, there is a need in Europe to coordinate community activities to develop and deploy common underpinning training services.

Within the broad thematic fields of Marine biotechnology and mariculture, which involves marine bioresources either as the source or the target of biotechnology applications leading to marine derived products, coordination and synergies between the most relevant RIs and IAPs led to the European Marine Biological Resource Infrastructure Cluster (EMBRIC) consortium. Underlining interoperability between research infrastructure, this knowledge-based cluster effectively strengthens the links between RIs, higher education and research institutions together with industry players. The aim is to, in cooperation with other EMBRIC work-packages, create an internationally competitive (online) environment and a continuous turnover of visitors and users at RIs and IAPs providing a unique training potential for young researchers, technicians, managers and advanced technology developers.

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<sup>1</sup> European Strategy Forum on Research Infrastructures: Strategy Report on Research Infrastructures (2016)  
<http://www.esfri.eu/roadmap-2016>

## 2 Introduction

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The discovery, development and exploitation of marine derived products for research and commercial development requires a skilled workforce to (1) select, harvest and manipulate resources,(2) to treat the generated data and foster new technologies,(3) to retrieve the economic potential, and (4) to overcome current and future interconnectivity barriers. Ensuring this workforce has the necessary skills, requires constant training and re-skilling. Therefore, the European Marine Biological Resource Infrastructure Cluster (EMBRIC) brings together and creates innovative training to meet the workforce requirements to foster innovation in marine biotechnology.

Several methodologies have been adopted to achieve the workforce requirements of tomorrow:

- An overview of existing training was given in the fields of discovery and development of derived marine bio-products and marker-assisted selection in mariculture within and outside the EMBRIC clusters' Research Infrastructures (RI) and Integrated Activity Projects (IAP). Currently, not all stages from discovery to final product development are covered by the existing training activities networks. Subsequently, *specific needs on training and education were suggested as thematic bottleneck recommendations and a SWOT-analysis was formulated in D 9.1.*
- a supporting framework was created as an EMBRIC integrated training programme to organise and disseminate training opportunities in order to boost continuous professional development (CPD) and human capacity building (HCB) in the EMBRIC community. (Deliverable 9.2). Several calls have been organized to endorse this activity.
- An online training information portal was set up (deliverable D 9.3) to build an integrated training programme. This was developed for the whole EMBRIC community to spread expertise and best practices between the nodes and to promote services offered. This includes both science and technology and targets both academic and industrial users. The online open access platform is available through the EMBRIC website ([www.embric.eu/training](http://www.embric.eu/training)) and gives an overview of all available courses related to the EMBRIC thematic domains. The EMBRIC training information platform is linked to and hosted by the EMBRIC (European Marine Biological Resource Centre, one of EMBRIC's RI's) Marine Training e-Platform ([www.marinetraining.eu](http://www.marinetraining.eu)).

All the deliverables of WP9 support training to harmonize practices and standards of procedures for the marine biotechnology and mariculture domain. Ultimately, EMBRIC spreads these best practices to academia and private sectors within and outside the consortium.

## 3 Analysis of the Knowledge Exchange WP (WP9)

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### 3.1 Recommendations (Deliverable 9.1)

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The EMBRIC project started with an analysis of existing training initiatives and several recommendations to overcome the knowledge gap which impedes further uptake of marine biotechnology. An overview of the recommendations:

#### 1. **RI specific bottlenecks**

The problems associated with sourcing and exploiting bioresources from the environment are numerous, from difficulties in growing or maintaining some of the organisms in the laboratory up to delivering a pre-finished product to business developers. A vast amount of training opportunities exist for the EMBRIC consortium partners. EMBRIC thematic workshops/trainings could tackle the following topics, currently absent or underrepresented in the EMBRIC sphere:

- best practice methods for harnessing the biochemical potential of marine prokaryotes
- best practice for the production of valuable secondary metabolites
- genetic engineering of microalgal strains
- technology transfer practices
- data standards for the marine domain
- novel techniques for protistan strains cultivation, metabolic profiling, bioassays, and chemical characterization
- progress in nutritional genomics
- commercial implementation of selective breeding technologies to promote knowledge exchange and adoption of best practices
- selective breeding in mariculture for higher yields and disease resistance
- access to and use of marine genetic resources
- transnational access regulation
- access and benefit sharing
- intellectual property (IP), governance and policy
- human capacity building and transferable skills
- methods and developments in computational resources
- ...

A ***more detailed breakdown*** of the themes covered in the thematic workshops/training can be found in ***section 3.2***. The organized training were overall aligned with the proposed bottleneck themes and a good number of participants were reached through the training scheme.

#### 2. **Transversal opportunities**

Novel transferable skills should be incorporated in the training offer. These should include soft skills for the human capacity building (HCB) and of EMBRIC researchers in their professional development. Offering soft skills in for example project development, data management, legislation and regulation, business improvement, technology transfer, and access and benefit sharing will facilitate exchange of best



practice amongst different fields within marine biotech and mariculture, and between academia and industry.

In addition to the above-mentioned internal transversal HCB agenda, training external users of EMBRIC should be taken into account. Under the EMBRIC training portal umbrella, courses for external academia and industry end-users given by the EMBRIC consortium and other related infrastructures and projects will be accessible. Even though the focus of the training portal is knowledge transfer in the EMBRIC domain, knowledge transfer in transversal skills are not excluded. By improving the end-users background knowledge, it will indirectly facilitate EMBRIC to reach its goals in developing marine derived products in a professional and efficient way.

Hence, human capacity building transversal training to internal EMBRIC partners are key to support the core developments within EMBRIC. Opening some of those opportunities to external academic and industry users will for sure be beneficial to the cluster even though knowledge and technology transfer to external users are focussed on EMBRIC's core competences.

***Section 3.4 provides a more detailed breakdown of activities undertaken by UGent*** to set up transversal training schemes. The development of a transversal online course aimed at the wider audience has been developed by UGent.

### **3. EMBRIC integrated training programme and training platform**

Apart from classical training schemes, alternative formats could be envisioned. Novel training schemes such as online training, MOOC's could be useful to promote standards and best practices to a broader audience than the audience present at a classical CPD short course. Of course, the use of a certain format will strongly depend on the content of the course; nevertheless, looking for alternative formats should be encouraged, since the audience reach is potentially higher. In addition, a reduction in travel and venue costs favours this type of course. It could also be an answer to the low participation of industry in classical CPD and HCB trainings. By lowering the accessibility threshold, an increased involvement of industries in EMBRIC training opportunities will be beneficial to the pipeline development speed and best practice exchange.

An integrated training programme has been developed and ***section 3.2 gives an overview of all granted proposals at EMBRIC partners*** with a number of participants reached. UGent has implemented novel training schemes by developing online courses both for a wider audience and for the EMBRIC community. ***Section 3.4 gives more information about the novel training schemes implemented by UGent.***

### **4. Assessment of EMBRIC knowledge transfer**

One of the threats to EMBRIC's knowledge transfer is the lack of correct and thorough evaluation and feedback, which will return a loss of impact and efficiency from future courses. In addition, novel techniques and new regulations arise continuously and should be incorporated in the newest CPD and HCB courses. Therefore, it would be

advised to put in place a group of experts in a training steering group, comparable to the Training Coordinators Group (TrCG) of ELIXIR. They will give advice on the latest advances from partnering RI, projects, business developments and EC regulations. The best fitting group should have access to all research infrastructures and work packages within EMBRIC. Within the EMBRIC consortium, such a group already exists and is represented by all the WP leaders, the Executive Board (EB). As such, training will be put on the foreground during the EB bi-annual meetings and it will allow to (re)direct courses to fit emerging topics and stay up-to-date with the state of art in the marine biotechnology, mariculture and product development sector.

Keeping track of the success and participants of the training organized through the integrated training program was one of the activities undertaken by UGent. Gathering all training related information as well as **feedback from these training events** could be organized in a more effective manner and **will be discussed in section 3.2**.

## 3.2 EMBRIC integrated training programme

### EMBRIC integrated training program:

Number of calls: 5

Number of training proposals: 17

Number of granted proposals: 8

Total number of participants: 207

	WP(s)	Title	Partner organizing	Date	Venue	Participants
<b>1st call</b>						
	WP5	EMBRIC-RISIS Training Course: the CorText platform	UPEM	9 March 2017	Paris	14
	WP5	RISIS Cortext Training - Publications Analysis	UPEM	3-4 July 2017	Paris	12
<b>2nd call</b>						
	WP4	ENA Sequence Retrieval Course	EMBL	13 March 2018 + 10 October 2018	Hinxton	11
	WP3	Successful roads from organisms to molecular tools	FMP	22-23 March 2018	Berlin	30-40
<b>3rd call</b>						
	WP4	Marine bacterial genome mining for novel pathways of commercial value and environmental context	UiB	26-30 November 2018	Tromso	20
	WP9	Science & Industry Workshop Series: Bringing the marine biological infrastructures knowledge to the industry	UGent	March-December 2018	Gent	14
<b>4th call</b>						
	WP6-7	Treasures from the deep: mining for valuable metabolites and enzymes from marine algae and bacteria	CCMAR	5th March 2019	Brussels, Belgium	50
	WP 3-6-7	Biosensors meet Blue Biotechnology: screening for bioactive (novel) Marine compounds	SZN	29-30 November 2018	Faro, Portugal	51

The fifth call did not yield any interest, probably due to the limited timeframe between proposal acceptance and EMBRIC project ending.

When looking at the topics presented during the training offers, we can assess that many of the topics cover the recommended training gap topics presented in deliverable 9.1. The training collectively yielded a high interest with more than 200 participants to all training. The attendance of each training opportunity was variable, this can be due to different factors. Some training were focused on internally educating the people working on the EMBRIC project to get acquainted with the activities and technologies of other partners. Other training opportunities were combined with a breakfast meeting at the European Parliament, thereby yielding a high interest. Specific training focused on outside users rather than the internal EMBRIC community had a moderate attendance rate due to the different communication and dissemination mechanisms used. Overall, it proved difficult for the EMBRIC project to reach people not directly related to the EMBRIC project as is the case for all research infrastructures. Therefore, we have proposed several recommendations in the communication and dissemination category further discussed in section 4.1.

## **Evaluation**

Evaluations from those organizing training events were received albeit not in a timely fashion, as the reporting process might have been too elaborate and too strict in terms of deadlines. If online templates could be provided, this would make the process easier. This would be a recommendation for future similar training programs as a possible activity incorporated in the MarineTraining.eu website. The reason behind obtaining the feedback and photographs was to be able to report about the success of the EMBRIC trainings, but to be able to use this content material on social media, the dissemination should be instant, not one month after finalization of the training. Therefore, this feedback was only used for documenting purposes. The participant list was not obtained for each training as some training organizers did not want to share details of the participants due to GDPR guidelines. Therefore, we mostly have an attendance rate of participants. An overall report about the content and success of the workshop was easier to obtain as this entailed uploading available content (agenda, ...) and providing specific information (e.g. participant details). We therefore recommend making this process easier in future projects using a similar approach albeit through on-line templates.

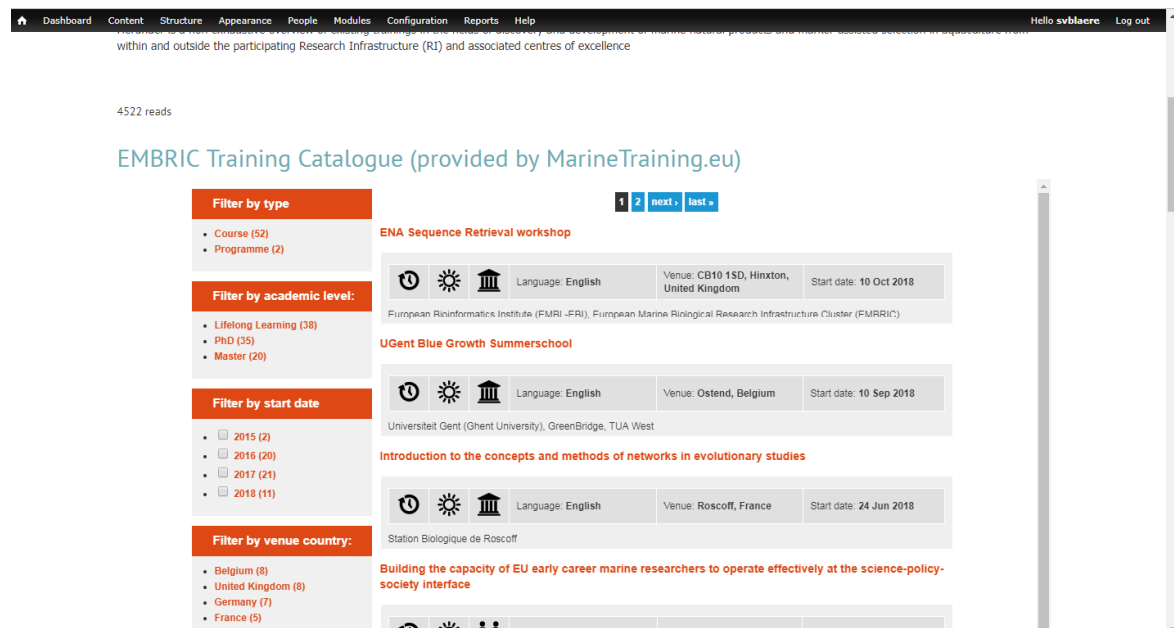
Annex 1 provides an overview of received training evaluations.

## **3.3 Online training portal**

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A total of 4522 views of the EMBRIC embedded online training portal have been received over the last 4 years. That is a considerable amount given the need to actively search for this training component on the EMBRIC website to be able to access it. By comparison, the views on the MarineTraining.eu website which has an average daily view rate of over 800 unique visitors. It is therefore interesting to think about the value

of integrating this website in the project website. Perhaps a distinct project link on the MarineTraining website and a referral on the EMBRIC website could also be used to achieve these results.



The screenshot displays the EMBRIC Training Catalogue interface. At the top, there is a navigation bar with links for Dashboard, Content, Structure, Appearance, People, Modules, Configuration, Reports, and Help. The user is logged in as 'Hello svblaere' and can click 'Log out'. Below the navigation bar, the page title is 'EMBRIC Training Catalogue (provided by MarineTraining.eu)'. The main content area features a list of training courses with various filters on the left side. The filters include:

- Filter by type:** Course (52), Programme (2)
- Filter by academic level:** Lifelong Learning (38), PhD (35), Master (20)
- Filter by start date:** 2015 (2), 2016 (20), 2017 (21), 2018 (11)
- Filter by venue country:** Belgium (8), United Kingdom (8), Germany (7), France (5)

The course list includes:

- ENA Sequence Retrieval workshop:** Language: English, Venue: CB10 1SD, Hinxton, United Kingdom, Start date: 10 Oct 2018. Organized by European Bioinformatics Institute (EMBL-EBI) and European Marine Biological Research Infrastructure Cluster (EMBRIC).
- UGent Blue Growth Summerschool:** Language: English, Venue: Ostend, Belgium, Start date: 10 Sep 2018. Organized by Universiteit Gent (Ghent University), GreenBridge, TUA West.
- Introduction to the concepts and methods of networks in evolutionary studies:** Language: English, Venue: Roscoff, France, Start date: 24 Jun 2018. Organized by Station Biologique de Roscoff.
- Building the capacity of EU early career marine researchers to operate effectively at the science-policy-society interface:** Language: English, Venue: Roscoff, France, Start date: 24 Jun 2018. Organized by Station Biologique de Roscoff.

### 3.4 Online training courses

In order to use the recommended alternative training formats suggested in deliverable 9.1, UGent has contacted several organizations to analyse the best platform for online courses. There are 2 available options for online course development:

1. Self-hosting an LMS system (Learning Management System)
2. Using an existing LMS platform

A thorough analysis of both options has been performed and UGent has chosen a combination of both. For large courses with a lot of assessment, UGent will cooperate with UNESCO-IODE platform 'OceanTeacher' which uses a Moodle LMS, one of the well-known LMS systems. They can give IT back-up when using the system and are very enthusiastic about hosting marine courses. Short tutorials with less interaction and a demonstration format will be hosted on the MarineTraining platform website and will be developed using the free and fully responsive program ADAPT.

OceanTeacher (oceanteacher.org):

Browse by Language: [English](#) | [Français](#) | [Español](#) | [Português](#)[Quality Policy](#)

Browse by Subject:

 <ul style="list-style-type: none"><li>• Data Management</li><li>• Marine Meteorology</li><li>• Ocean Observation</li></ul> <p>Topics include Marine GIS, Bio Geography, Cruise Planning and Oceanographic Sampling</p>	 <ul style="list-style-type: none"><li>• Information Management</li><li>• Disaster Recovery</li></ul> <p>Topics include Digital Asset Management, E-repositories, Disaster Planning and Recovery.</p>	 <ul style="list-style-type: none"><li>• Marine Spatial Planning</li><li>• Tsunami</li><li>• GIS</li></ul> <p>Topics include Coastal and Marine Spatial Planning and Management</p>	 <ul style="list-style-type: none"><li>• OBIS</li><li>• Harmful Algal Blooms</li></ul> <p>Topics are related to marine biodiversity data and information management.</p>
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HEADQUARTERS

UNESCO/IOC Project Office for IODE, Ostende, Belgium

## ADAPT ([www.adaptlearning.org](http://www.adaptlearning.org))

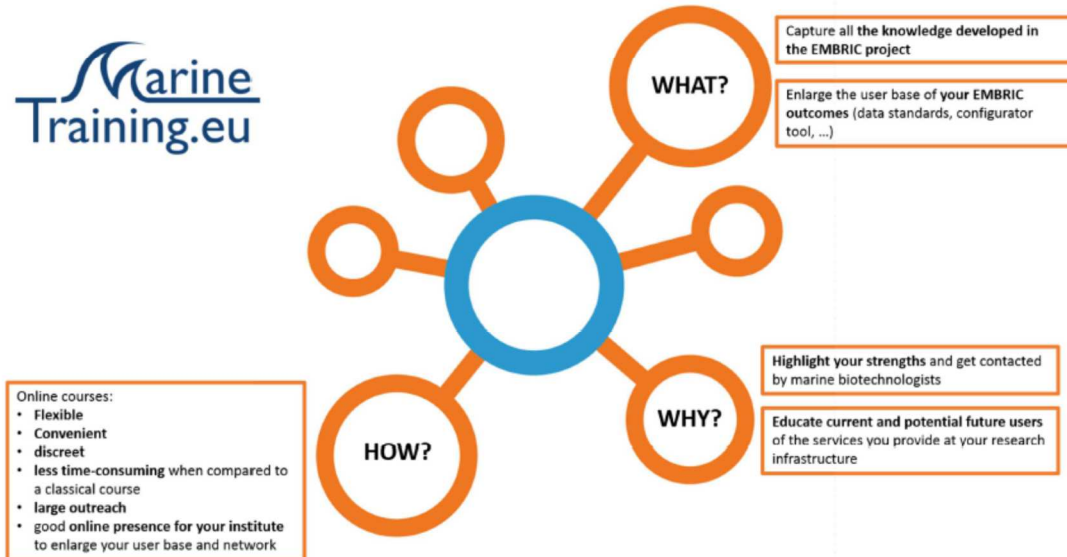
To get acquainted with both online learning tools, the Marine Training Platform team has developed a soft skills course with the OceanTeacher platform (Project Management, Data Management and Data Communication) and an EMBRC tutorial with the ADAPT tool. The former course has been developed due to the recommendation suggested in deliverable 9.1 at the beginning of the EMBRIC project in providing transversal training opportunities to the EMBRIC community and to the blue community as a whole. This course has been through a test run in the fall of 2018 and will be made available to the blue community in the summer of 2019. The EMBRC tutorial will be accessible through the Marine Training website from June 2019 onwards and will be communicated to all EMBRC-ERIC community members.

The WP9 coordinator has reached out to the Executive Board to make use of these online tools and to co-develop online courses to reach more people with the EMBRIC project (see below) and 1 of the EB members replied positively.

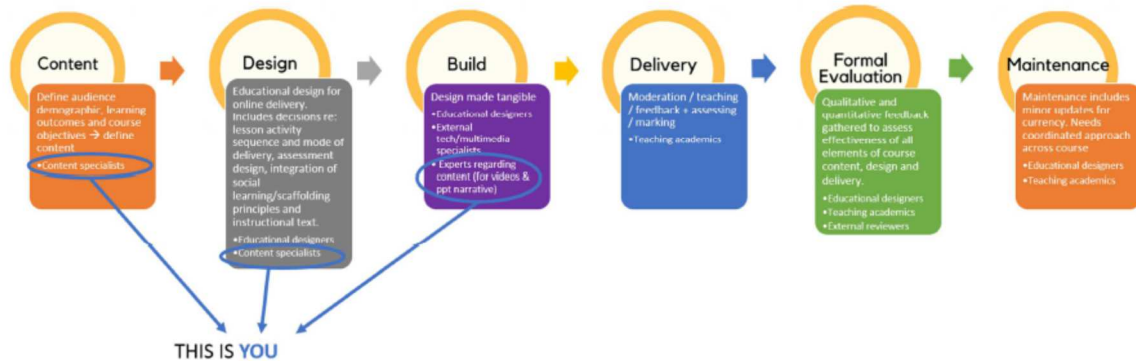
## WP9: Training and exchange of best practice



### Objective



### Process



### What next?

To start the process of creating an online course of your WP (work package), you first have to appoint a responsible person at your institute or of your work package to make sure that there is a single point of contact for all further communication between the Marine Training Platform (MTP) and the WP online course responsible. This person can then contact Shanna Vanblaere ([shanna.vanblaere@ugent.be](mailto:shanna.vanblaere@ugent.be)) to set up a meeting in which all further action will be taken. The practical process will look something like this:

1. Skype call between MTP (UGent) & WP online course responsible (October)
2. Theme + learning outcomes definition (October - November)
3. Brainstorm regarding content available, content needed & full course design (November - January)
4. Gathering of all missing content (interviews, video's, ppt's, ...) (January - March)

5. Online course building (February - April)
6. Evaluation (May)

Upon further discussion, however, it was clear that there was a lot of input still needed to be developed for the online course and there were not enough resources available at the partner institutions to be able to develop an online course.

We suggest to keep investing in success stories of online tutorials and to keep track of all users of these online tutorials as this will give an incentive in future projects to entice other members to dedicate time and energy to the development of online material to highlight their knowledge and skills. Although 'alternative' training formats were encouraged in all calls for training through the integrated EMBRIC training programs, all training organizers chose a traditional face-2-face approach. One option could be to divide the available training budget to face-2-face but also to online training as this could incentivize training organizers to make use of online materials to give their courses back-up 'blended learning' or to make a full component of their course online.

## 4 Cluster's training connectivity

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### 4.1 Dissemination channels

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The overarching EMBRIC communication and dissemination plan (D1.1) had several ambitions:

1. strengthen the connection of science with industry by promoting user access via a one-stop portal;
2. geographically defragment public and private-sector communities in the domain of marine biotechnology;
3. engage in training new users, with a focus on spreading best practices in integrated marine biotechnology workflows;
4. communicate directly with key stakeholders to ensure the sustainability of EMBRIC;
5. disseminate the project's results to research leaders that will promulgate EMBRICs potential, cultivate new ideas and drive organizational change and innovation;
6. ultimately, increase awareness of the cluster's capacity overseas.

The EMBRIC training information portal (D9.3) mainly provided assistance to ambitions 1 and 3 of deliverable D 1.1 of Work Package 1. Work package 9 in charge of EMBRIC training coordinated this task at a consortium level. To accomplish this objective, WP9 worked in close collaboration with each of the nine other WP leaders to monitor training initiatives and best practice transfer opportunities in the different WPs and partner organisations.

Ghent University (UGent, EMBRIC partner 16) was in charge of hosting and performing the maintenance of the EMBRIC training information portal page. It has an extensive know-how on course organisation and thus assisted EMBRIC partners by gathering training information from the consortium and by disseminating it using the above-mentioned channels.

In short, information on potential EMBRIC related training was firstly gathered by contacting the work package leaders of WP 2-8. Secondly, the cluster's Research Infrastructures and Integrating Activity Project were requested to share training activities in their networks. Finally, relevant training opportunities outside EMBRIC, for instance, in closely related ESFRI infrastructure's, existing training programmes, industry cluster or policy networks, was harvested and added to the training information portal. Dedicated tools and specific means of dissemination to target specific audiences, including user communities (EMBRIC consortium, students, scientific community), private sector (Small and medium enterprises, industry), policy makers (regional and national governments) and the wider public. The specific means of



dissemination are elaborated in (Table 1, section 4.2). This plan included, amongst others:

- 1) posting on the EMBRIC training information portal and associated platform
- 2) diffusion of the training events through 'other' online means, such as, the project's newsletters, press releases, internal bulletin, various social communication channels, partners' websites and infrastructures' websites, etc.
- 3) creation of promotion material following the project's identity and graphic chart
- 4) participation at relevant workshops or other international initiatives to present future trainings, for instance, knowledge and innovation communities business summer schools, specialised master courses, alumni networks, etc.

**Evaluation**

It has proven difficult and time-consuming to gather all information from EMBRIC partners and associated partners to list on the website. The Marine Training website aims to be an all-encompassing website providing training overviews in all blue sectors as there is an overlap of marine biological resources with all sectors, not only the marine biological resources sector. In order to change the initial set-up of the Marine Training Platform to gather content through partners to a **self-maintaining website** through which training organizers are enticed to upload their trainings, an **analysis for the Marine Training website has been performed to change the user experience of the website and to change the set-up of the website** in order to make it more appealing and to provide a return on investment for training providers.

**4.2 Target audience**

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In the following table (Table 1) a list of target groups and relevant associated dissemination activities and pathways is described.

<p>EMBRIC consortium</p>	<p>EMBRIC will serve as the main forum for dissemination of training activities. Given the fact that more than 80 people are part of this consortium, several meetings will be carried in small groups by WP and will be organized and coordinated by WP leaders, whom can be easily informed of novel initiatives through the Executive Board, they are members of.</p> <p>In addition, EMBRIC's General Assembly meetings will be taken as an opportunity to share updates. These are free of registration fees and invite marine biotechnology-related institutions, policymakers and industrial partners, which on their turn can take the information back to their networks</p>
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	<p>An Internal Bulletin will circulate every 3 months (starting from M16) within the EMBRIC partners to update the cluster on internal news. Amongst these, relevant information on trainings will be shared.</p> <p>The EMBRIC advisory board (WP1), the transnational access liaison officers (WP10) and the community of practice among Technology transfer (TT) officers representing the different RIs (WP5) will be key to bring information to relevant infrastructures and other projects (both EU and non-EU funded) such as ERA-NET MBT, European Marine Board (EMB), JPI Oceans, CPMR, Euromarine, Assemble+, ENVRI+, Corbel and others.</p>
<p>Scientific community</p>	<p>The consortium and project management team surveyed existing conferences, workshop and fora in order to select those that would be beneficial to the project. The presentations associated with conference publications provided an important opportunity for additional dissemination.</p> <p>Workshops, joint events, special sessions in conferences and other similar best-practice events completed the scientific dissemination plan. On those targeted events, awareness was raised and collaborations with other related projects training plan were promoted.</p> <p>Besides the publication of original research results, EMBRIC made use of other types of publication outlets, in particular external newsletters, to disseminate results obtained in the project (WP 2-8) and to announce or report on training activities promoted by the project consortium.</p>
<p>Students</p>	<p>Within the RIs and IAPs of the EMBRIC consortium, academic partner institutes hold existing Master and PhD programmes focussed on the marine thematic. These graduates are the workforce of tomorrow and will directly be involved as target audience for EMBRIC integrated trainings</p> <p>To officialise the link between the RI cluster and students, EMBRIC will recognise MSc and PhD programmes linked to RIs. For instance two examples of existing linked MSc programmes: (1) the International Master in Marine Biological Resources (IMBRSea), is a joint Master programme organized by nine leading European universities in the field of marine sciences; Ghent University (BE), University of Pierre and Marie Curie (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), University of Bergen (NO) and Université de Bretagne</p>

	<p>Occidentale (FR), supported by fourteen Marine Research Institutes belonging to the European Marine Biological Resource Centre (EMBRIC). Based on the objectives of the EMBRC consortium, IMBRSea covers a wide, yet consistent, range of subjects related to the sustainable use of marine biological resources. With an emphasis on marine biological and ecological processes, the programme links biology of marine organisms and environmental studies with subjects in marine policy and planning. (2) The Executive Masters in Management of Research Infrastructures is aiming to develop transferable skills for leading Research Infrastructures with global impact. This master programme is offered by the RITrain<sup>2</sup> coordinated by a consortium hosted at the University of Milano-Bicocca, including EMBRIC's RI Elixir and MIRRI.</p> <p>Those student networks might reveal very useful, particularly since they have alumni networks, which can be used to spread training initiatives beyond the educational sphere into industry and policy.</p>
Industry	<p>Communication with industry involved the assembly of EMBRIC company fora on mariculture and microalgae. Companies were invited to join the fora and thus automatically gained access to the training information portal. Those companies had the privilege to be informed first of EMBRIC training initiatives and funding calls for training organisers.</p> <p>Existing industry training activities from other infrastructures, organisations or projects outside the thematic area of EMBRIC were looked into. For instance, business summer schools from EIT Knowledge and Innovation Communities<sup>3</sup> could serve as blueprint for closer interactions with the industry. These are especially focussed on transversal skills such as creation of tomorrow's entrepreneurs.</p> <p>In the framework of building interconnectivity with regional development policies, EMBRIC WP9 will be in close collaboration with CPMR and regional business clusters, disseminate training activities to industry partners. For instance, UGent, partner 16 and WP9-leader has an understanding with the regional Flanders Maritime Cluster<sup>4</sup> to disseminate relevant training opportunities. The</p>

<sup>2</sup> Rltrain, the Research Infrastructure Training Programme, is an EU-funded Horizon 2020 project aimed at improving and professionalizing the training of managerial and leadership staff in research infrastructures (RIs). <http://emmri.unimib.it/en/ritrain-project/>

<sup>3</sup> EIT's Knowledge and Innovation Communities (Innovation Communities) are partnerships that bring together businesses, research centres and universities <https://eit.europa.eu/activities/innovation-communities>

<sup>4</sup> Flanders' Maritime Cluster (FMC) is the largest maritime network in Belgium. The mission of FMC is to encourage Flemish companies to cooperate for the development, demonstration and commercialization of innovative solutions for sustainable blue management <https://www.flanders-maritime-cluster.be/>

	<p>added value of cooperating with industry clusters is that they design yearly an industry catalogue to promote their members to the market. These catalogues could be used as reference point for compiling a European Marine Biotechnology and mariculture ‘Blue business catalogue’ to promote training in the private sector.</p>
<p>Policy makers</p>	<p>The 30-partner consortium exchanged with the industry, linked to related infrastructures and participated in dialogue with regional and national policy-makers. Besides implementing essential activities in coordination, management and communication, WP1 was responsible for sharing and promoting the EMBRIC vision. Within that vision, the training information portal played a major role. In the third and fourth year of the project, policy events at the European parliament tackling topics such as “Releasing the economic potential of marine biotechnology” were planned. Those events were be crucial for the dissemination of EMBRIC activities and philosophy to Members of the European Parliament. Especially, since these MEPs are involved and represent sustainable development, environment and industry issues.</p> <p>In addition, on regional levels, local universities and organisations, partners of EMBRIC participated in policy-stakeholders events. Dissemination at such events were important and led to higher awareness at policy level of the Blue marine biotechnology possibilities and mariculture knowledge transfer landscape in Europe.</p>

**Table 1 Target audience and linked training dissemination activities**

## 5 Concluding recommendations for EMBRIC training

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### 5.1 Communication

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Communication about training should always be incorporated in the general project and research infrastructure training. Apart from that, traditional, proven communication channels can also be implemented to access external participants.

A project-specific communication strategy has been proven less successful due to the limited nature of project duration.

- The **success of training communication** is largely decided by the robustness of the **communication strategy of each research infrastructure** and the distribution of communication to the right user groups. Reaching potential users requires a rigorous communication strategy of both a project for internal communication to communication managers of the research infrastructures and partners and subsequent communication strategy of research infrastructures and individual research partners to their user group. Not all research infrastructures succeed in reaching all users. Therefore, the Executive Board Committee of EMBRIC has decided that a **branding and marketing exercise** would be beneficial for research infrastructures of EMBRIC. Due to the limited time and financial possibilities, it was decided that these strategies would be implemented for the approved ERIC clusters (EU-OpenScreen and EMBRC-ERIC).

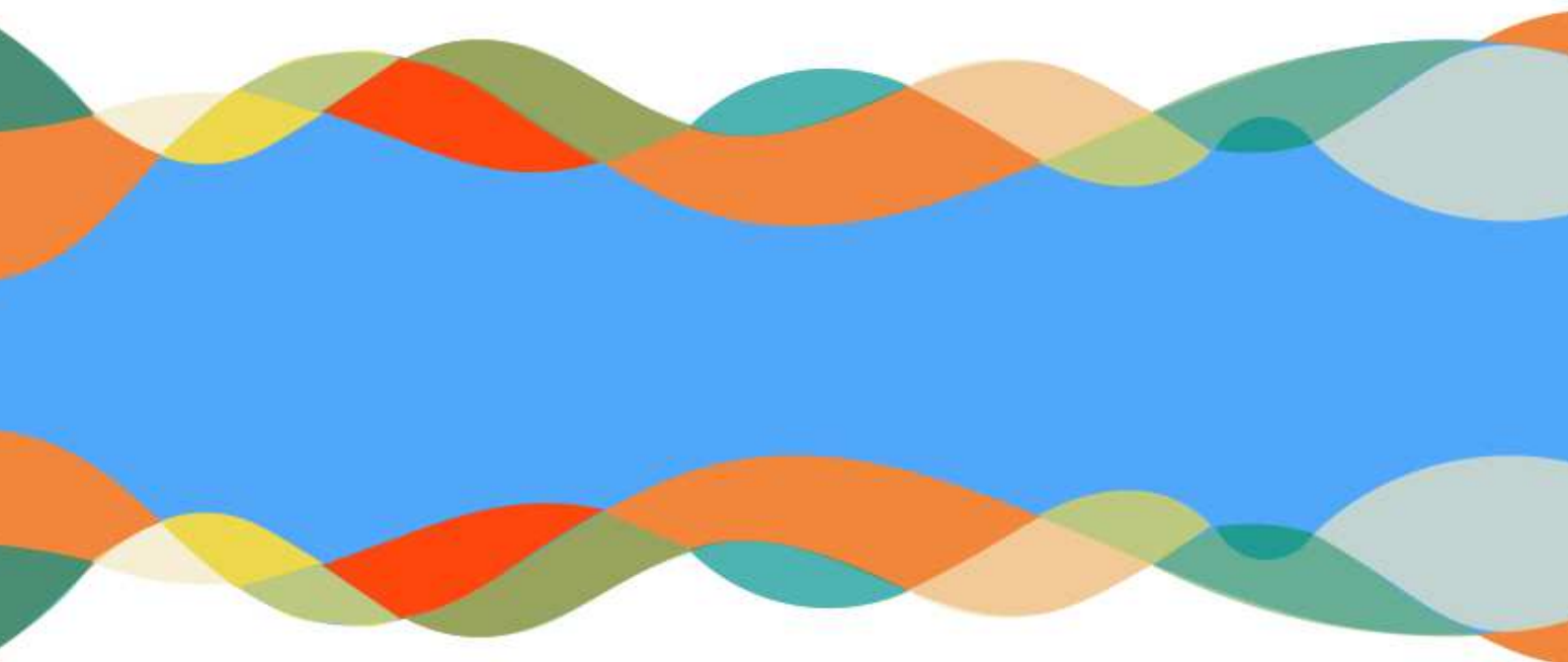
### 5.2 Quantitative metrics

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Since the proposed evaluation methods were not widely distributed among the training providers, it was not possible to do a quantitative analysis of the given training. The only training provider having collected extensive feedback information from their participants was Elixir which already has an online support system for training and the collection of feedback from users. A good online support system could aid other research infrastructures and training providers not in possession of this online system in gathering evaluation statistics. Both training provider and users could be contacted after completion of the training to give an anonymous evaluation and feedback of the training. This avoids the training organizer from having to distribute and gather evaluation forms under time constraint and saves them the additional trouble of contacting participants and gathering non-anonymous evaluation forms upon completion of the training.

- An **analysis** has been performed for the **Marine Training website** to check the possibilities of making **training organizer and user interaction and automatic**

**registration and subsequent evaluation** more user-friendly and less time-consuming.







## 6 Annex 1

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### 6.1 ENA Sequence Retrieval

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#### **Reporting for the EMBRIC integrated training programme**

##### **Activity report summary**

The “ENA sequence retrieval day” on the 10<sup>th</sup> of October 2018 was run at the European Bioinformatics Institute (EBI) and it was attended by 10 scientists at different stages of their career, from PhDs, post-docs, data analysts and principal investigators. The training provided insight on how to use the European Nucleotide Archive (ENA) for search and downloading data. Participants had the opportunity to bring their own use cases and questions. During the training, marine data and metadata were referenced, including the full genome sequence of *Balaenoptera acutorostrata scammoni* (whale species).

See in attachment three activities pictures

##### **General Assembly report - Agenda, goals and outcomes**

###### Agenda of the day:

9.30 Welcome & introduction

9.45 Searching ENA

11 Break

11.15 Environment setup & Downloading data

12.45 Lunch

1.30 Downloading data (cont.)

3 Break

3.15 Use cases

4.30 Close of day

###### Goals and outcomes:

This training introduced ENA users to:

1. Advanced search and the ENA portal API
2. Downloading sequence data from the ENA browser:
3. Downloading run/analysis data:
4. ENA browser tools <https://github.com/enasequence/enaBrowserTools>
5. Exploring links between ENA data (data types and other resources)

## 6. Specific use cases - discussion and assistance

At the end of this course participants were able to:

- Explore and search ENA
- Use ENA resources to retrieve relevant information
- Apply the information they have learned to their own specific research

This training was aimed at a wide range of users that needed to retrieve data from ENA, either occasionally or on a regular basis and it focused on marine examples. The training also aimed at researchers that were planning to download large volumes of data.

See in attachment participant list with contact details

## 6.2 Successful Roads from Organisms to molecular Tools

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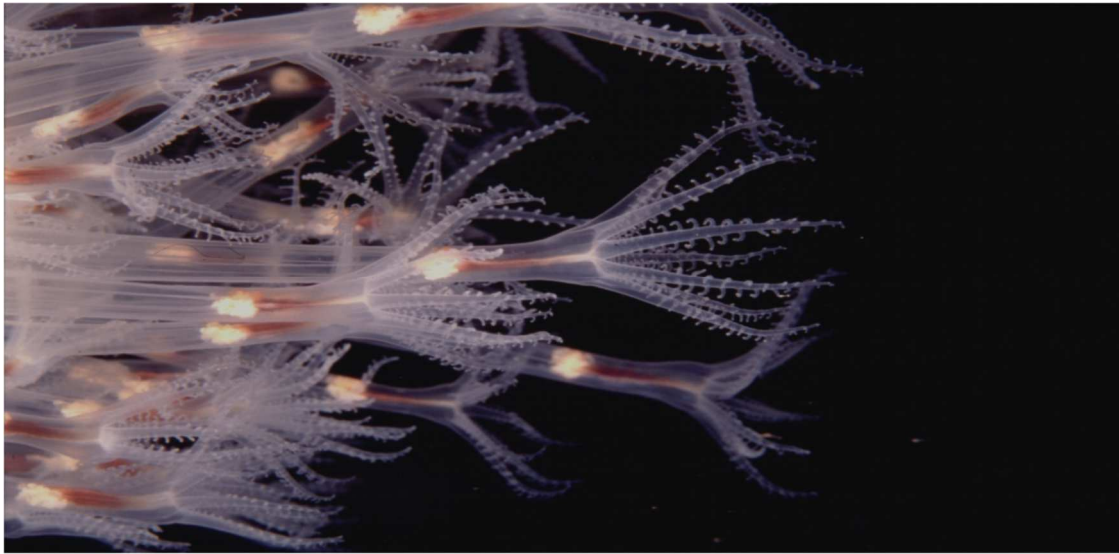
Report EMBRIC Symposium „Successful Roads from Organisms to molecular Tools“

The EMBRIC Symposium „Successful Roads from Organisms to Molecular Tools“ took place in Berlin on 22./23. March 2018 at the EU-OPENSREEN premises on the campus Berlin-Buch. During this two-day event speakers and participants external and internal to the EMBRIC consortium discussed the potential of novel discoveries from marine organisms in the fields of secondary metabolites, carbohydrates and proteins. The EMBRIC online visualisation tool was introduced and perceived well. Beside the talks presenting novel work in the abovementioned fields, there were coffee breaks, lunches and a social dinner for numerous networking activities. Participants emphasised the quality of the scientific content presented and the meeting was perceived well overall. Due to its success, EU-OPENSREEN considers having similar events on a yearly basis—especially given its plans of expanding its compound collection towards natural products from various sources.



## 6.3 Biosensors meet blue biotechnology

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### **BIOSENSORS MEET BLUE BIOTECHNOLOGY: SCREENING FOR NOVEL BIOACTIVE MARINE COMPOUNDS**

**CCMAR, Faro, Nov29/30**

#### **Summary**

A workshop on Biosensors and Blue Biotechnology was organized by CCMAR on the 29<sup>th</sup> and 30 of November in Faro, Portugal. The workshop was supported by EMBRIC, in the framework of advanced training activities and linked to the development of WP3 and WP9 activities. The workshop program included both theory and practice and invited experts from Academia and Industry contributed to the training offer. This workshop was intended to provide an integrated perspective on Biosensors, theoretical and fundamental approaches, as well as technological applications. The overall aim of the workshop was to validate and consolidate the potential of biosensors as dynamic tools for biodiscovery and blue biotechnology. The program was divided into two different activities: a mini-conference with oral presentations followed by an open discussion and a practical. hands on experiment where participants had the opportunity to contact with different biosensing technologies and instruments.





## 6.4 Treasures from the deep

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### **Activity report for the workshop Treasures from the Deep**

On the 5<sup>th</sup> of March, 2019, EMBRIC work packages 6 and 7 held a breakfast meeting at European Parliament hosted by Clare Moody MEP for UK South West and Gibraltar. This was followed by the workshop *Treasures from the Deep* held at Scotland House, Brussels. Around 20 scientists, including three early career scientists, gathered at the European Parliament to meet Clare Moody to present the needs and opportunities of the marine environment. The debate continued at the workshop which was attended by around 50 scientists and company representatives. Oral and poster presentations were given, as illustrated in the event programme, attached. An attendance list is available. During the scientific discussion, participants presented their current successful advances, showcasing the opportunities of the marine ecosystem.

A full day of lively debate climaxed in a round table led by Dr Marcel Jaspars and Dr Melody Clark. Ms Clare Moody and Baroness Mobarik joined the round table bringing together representatives of academia, industry and parliament to discuss the needs of the field. Among the points touched, was the fact that academia and industry are willing to share their expertise and match their time frame to work together at a European scale, but to do so more effectively, stronger support from European Parliament was needed. Discussions highlighted the need for the EU to support SMEs and small-scale projects to facilitate products getting to market. Indeed, SMEs have different needs and challenges than research institutions and these have to be considered in the European funding strategy. It was stressed that the potential of marine resources and its sustainable exploitation are still relatively untapped due to regulatory limitations. Uncertainty of further funding and support at the end of large-scale projects investing in the discovery of new compounds from the marine environment has been recognized as another big limitation. The support of infrastructures such as EMBRC might partially address the need to sustain activities and interactions beyond the end of the lifetime of large projects; protecting public investments in research by enabling the generated resources to be maintained for future use and exploitation thus contributing to the blue economy.

The event was organized by Rebecca Goss (USTAN), David Smith (CABI) and Mariella Ferrante (SZN).





## 6.5 Hands-on workshop in Marine Metagenomics

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### Report “Hands-on workshop in Marine Metagenomics”

#### Abstract

The aim of the workshop is to introduce the participants to the research field of metagenomics with focus on samples from the marine environment. The theoretical part for each subject will be introduced via lectures, followed by a practical Hands-on session.

The themes that will be covered are: pre-processing of sequence data, 16S rRNA amplicon analysis, taxonomic and functional analysis, assembly and binning, and metagenomic assembled genomes.

#### **Agenda**

Time: Monday 26th to Friday 30th November (09.00 - 16.00)

Place: The Arctic University of Norway

<https://elixir.mf.uni-lj.si/enrol/index.php?id=43>

<https://tess.elixir-europe.org/events/hands-on-workshop-in-marine-metagenomics>

<b>Day 1</b>	
09:00 - 09:20	Welcome and round of presentation by participants (Erik)
09:20 - 09:30	Log on to virtual machines for the first time (Erik)
09:30 - 10:15	Introduction to metagenomics (Nils)
10:15 - 10:45	Coffee break
10:45 - 11:00	Introduction to EeLP (Marko)
10:00 - 12:00	Introduction to Linux command line and Conda (Espen J)
12:00 - 12:30	Sequencing technologies for metagenomics (Espen S)
12:30 - 13:30	Lunch
13:30 - 14:00	Quality control, filtering (Erik)
14:00 - 14:30	Taxonomic classification using amplicon markers (Nils)
14:30 - 18:00	Hands on - Amplicon data analysis using Qiime2/MicrobiomeAnalyst (All)
15:00 - 15:30	Coffee break
18.00	Dinner - Science Park
<b>Day 2</b>	
09:00 - 09:30	Summary day 1
09:30 - 10:00	ELIXIR - A distributed infrastructure for life-science information (Nils)
10:00 - 10:15	Coffee break
10:30 - 11:00	META-pipe analyses platform (Espen)
11:00 - 12:30	Assembly & validation (Erik)
12:30 - 13:30	Lunch
13:30 - 18:00	Hands on - Quality control, filtering, assembly & validation (All)
15:00 - 15:30	Coffee break

<b>Day 3</b>	
09:00 - 09:30	Summary day 2
09:30 – 10:30	Taxonomic classification of metagenomics samples (Erik)
10:30 - 11:00	Coffee break
11:00 - 11:30	New data resources for marine metagenomics (Nils)
11:30 – 12:30	Hands on - Taxonomic classification & functional assignment (All)
12:30 – 13:30	Lunch
13:30 - 15:00	Hands on - Continue on Taxonomic classification & functional assignment (All)
15:30 - 18:00	Hands on - Functional assignment (All)
15:00 – 15:30	Coffee break
<b>Day 4</b>	
09:00 - 09:30	Summary day 3
09:30 – 10:30	Genome assembly from metagenomic reads - MAG (Erik)
10:30 - 11:00	Coffee break
11:00 – 12:30	Hands on - MAG (Erik)
12:30 – 13:30	Lunch
13:30 - 15:00	Hands on - visualization of data (All)
15:00 - 15:30	Challenges in comparing metagenomics (Espen J)
15:30 – 16:00	Coffee break
16:00 – 18:00	Hands on - Comparative metagenomics (All)
<b>Day 5</b>	
09:00 - 09:30	Summary day 4
09:30 – 12:00	Group work: Metagenome: Taxonomic and functional analysis, binning e.g. MAGs
10:30 - 11:00	Coffee break
12:00 – 12:30	Lunch
12:30 – 15:30	Open session - Presentation of group work Discuss participants projects in smaller groups
14:00 – 14:30	Coffee break
15:30 – 16:00	Wrap-Up

***Survey***

See attached panel report (Feedback.pdf)

***Photo***

See attached photos from the workshop