



**Report of EMODnet
Open Sea Lab II**

The Open Sea Lab team is proud to work with:



This event was organised by the EMODnet Secretariat, in collaboration with VLIZ, Copernicus Marine and ICES, and with the contribution of imec and Marine@UGent. Supported by the European Commission and VLIZ.



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The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund.

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Figure 1. Upper left: StartUp village in Antwerp (Belgium); upper right: Maria Sotiropoulou (HCMR); lower left: OSLI participants in plenary session; lower right: teams working on their idea.

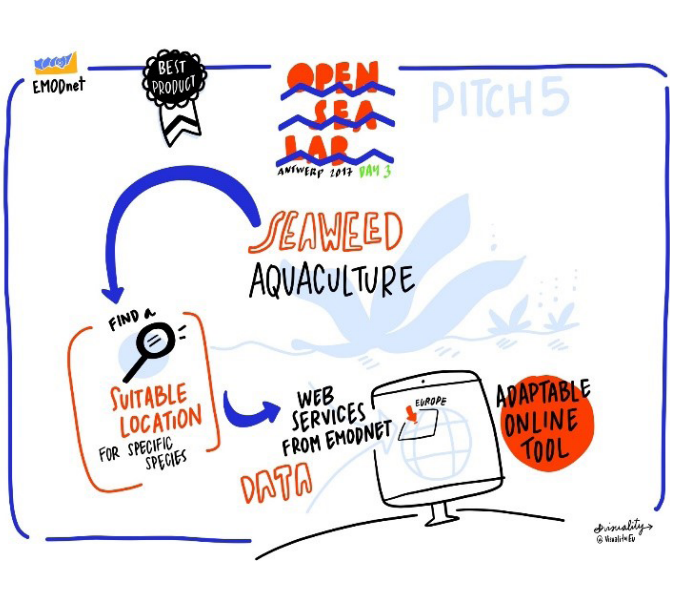


Figure 2. Winning Team 5 at the first edition of EMODnet Open Sea Lab (left), and their concept illustrated by visuality.eu

REPORT OF EMODNET OPEN SEA LAB II

1 EMODnet Open Sea Lab: Background

1.1 Why Open Sea Lab

Open Sea Lab was conceived from a desire to increase the awareness and use of EMODnet data. The open data resources available via EMODnet hold great potential to create new business opportunities; to increase ocean knowledge and understanding of our marine and coastal environments; and to underpin better management and protection of Europe's precious marine resources. But how can this potential be realised and how do we demonstrate it to users?

The idea of an EMODnet hackathon came up during one of the breakout sessions at the first EMODnet Open Conference in 2015¹, as a means to generate interest and stimulate innovation from EMODnet data and products by new communities. Subsequent discussions between the EMODnet Secretariat and VLIZ led to a pilot study with imec.living labs, specialists in user-oriented innovation. The end-result was the first Open Sea Lab, which took place in November 2017 in Antwerp (Belgium) as a collaboration between the EMODnet Secretariat, Flanders Marine Institute (VLIZ) and imec, and with support from the European Commission's Directorate General for Maritime Affairs and Fisheries (DG MARE).

Open Sea Lab is much more than a hackathon, it is an expert-led, deep dive into the world of marine Open Data. It adopts a user-focused approach and participants are guided by entrepreneurial specialists, imec, to create applications that are tailored to user needs.

1.2 EMODnet's First Open Sea Lab: a look back

Participants from 15 countries (including Canada) with diverse backgrounds and skill sets came together from 15-17 November for the first EMODnet Open Sea Lab, in the stimulating environs of the StartUp village in Antwerp, Belgium (Figure 1). This three-day event saw the participants coached by organisers from EMODnet, VLIZ and imec through expert-led workshops and one-on-one trainings to improve their data manipulation, business-modelling, user-testing and pitching skills. The full programme, including speakers' presentations can be found at <http://www.opensealab.eu/2017>.

For those in need of more inspiration, invited speakers provided some stimulating presentations. **David Mills**, iMarDIS-SEACAMS, provided a retrospective and future look at marine data collection and sharing. **Maria Sotiropoulou**, HCMR, representing the Big Data Ocean project, described their plans to enable maritime big data scenarios. **Gerben deBoer**, Van Oord, kicked off Day-2 with a keynote on marine data challenges and solutions, providing an industry perspective on data use and sharing as well as advice for participants and data managers. **Juliette Rimetz**, Technopole Brest-Iroise, shared their experience of organising the 2nd Ocean Hackathon in Brest. Finally, **Frederic Bardolle** discussed Ethics in Artificial Intelligence.

The five competing teams worked with great enthusiasm and determination to develop their ideas in only three days, combining data from EMODnet portals, but also from other sources such as CMEMS and ICES. Diverse and advanced concepts and demos were presented to the jury at the end of Day 3. The outputs ranged from tools to support fishermen, environmental managers and the windfarm sector, to marine tourism apps for the general public. A common theme was the need to develop an interface that could harness the vast resources of available marine data and make these accessible for users in a way that they can understand and use them to address their specific needs.

1. http://www.emodnet.eu/sites/emodnet.eu/files/public/OpenConference/Breakout_Session_Summary_Report_Final.pdf

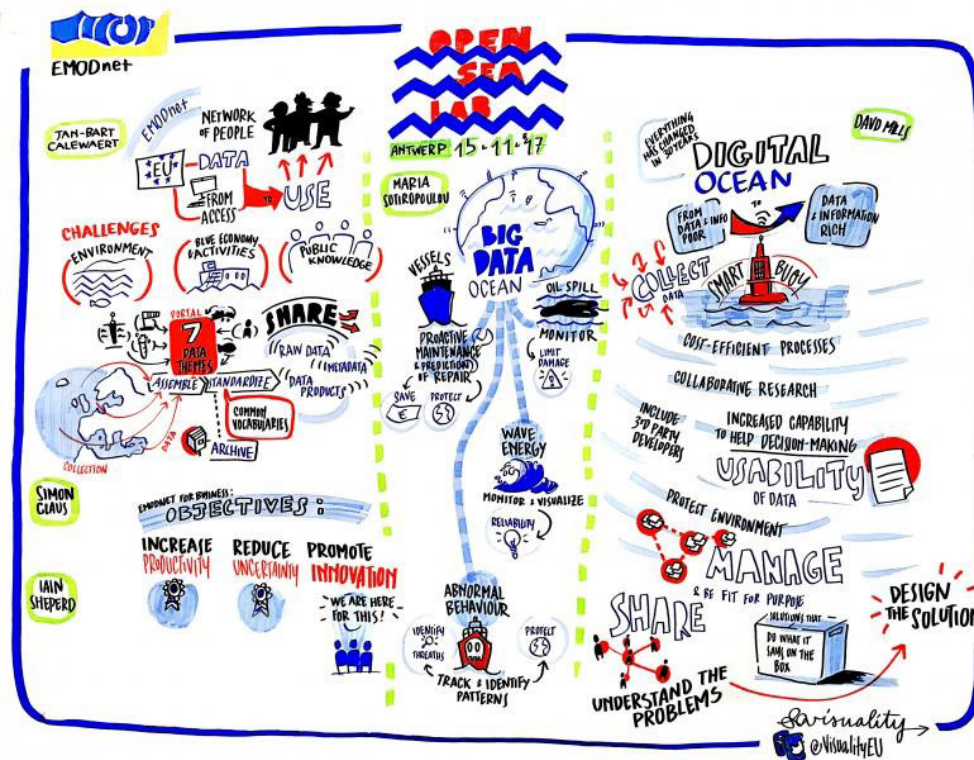


Figure 3. The EMODnet Open Sea Lab concept illustrated by visuality.eu

The winning product, developed by Team 5 (Figure 2), was a tool to identify suitable sites to farm seaweed in Europe. Information on all the outputs from EMODnet’s first Open Sea Lab can be found at <https://github.com/EMODnet/OpenSeaLab>.

In addition to the innovative products developed, Open Sea Lab provided a unique opportunity to test EMODnet data and services, with EMODnet developers and coaches on hand throughout the event to identify problems and learn where EMODnet data and services could be improved to better address user needs.

The EMODnet Secretariat received extremely positive feedback from all the organizing bodies as well as the coaches and the participants, with many asking if there would be a second Open Sea Lab. OSLI was summarised in a seven-minute video² which gives an overview of the event and award ceremony with interviews of participants.

2 EMODnet Open Sea Lab II

2.1 Kick-off event and launch of the challenges

EMODnet’s second Open Sea Lab sought to build on the success of the first Open Sea Lab and to extend the data resources available. It was officially launched on 24th of May in Brussels, at a kick-off event that marked the opening of applications for OSLII, to take place in the vibrant and historic city of Ghent from 4-6 September 2019.

The event also revealed the ‘challenges’ for OSLII and provided a taster for what was to come in September. Jan-Bart Calewaert (Head of the EMODnet Secretariat) opened the event by welcoming all those present and tuning in online. Reflecting on the success of the first Open Sea Lab, he said that OSLII would build on this and he was delighted to announce that EMODnet, VLIZ and imec, co-organisers of the first Open Sea Lab, had now been joined by ICES and Copernicus Marine.

2. https://www.youtube.com/watch?time_continue=5&v=RiiYt2YRRLM

Launching the afternoon's programme, Iain Shepherd (European Commission, Directorate-General for Maritime Affairs and Fisheries - DG MARE) (Figure 4), explained the relevance of OSII to EU Policy. On November 28th 2018, the EU set out its strategic long-term vision³ for a zero carbon economy by 2050. Stressing that our seas and oceans would play a crucial role in reaching these targets, Iain Shepherd said that future demands on the ocean as a source of sustainable energy and food will require ever more access to data, particularly to ensure that the growth in the ocean economy is achieved in a sustainable way. Open Sea Lab provides an opportunity to develop some applications to support the sustainable use of our marine resources.

'Are we taking open data for granted?', was the question posed by Conor Delaney, Environmental Data and GIS Expert, in his keynote presentation. Providing a review of the evolution of marine open data over the last ten years, Dr. Delaney noted that open data is democratizing science by providing everyone with equal access. We should appreciate that this is a valuable resource and expensive to produce. In the proliferation of open data we need to be able to trust the data and this is where portals such as EMODnet, Copernicus Marine (CMEMS) and ICES are so important, by providing free access to quality data of known provenance and recognising the data providers. Hackathons, such as Open Sea Lab, aim to connect open marine data and society. How open marine data can serve societal needs, is exactly the concept at the core of Open Sea Lab. To explore this further, the next session focused on the challenge areas that applicants to OSII would be invited to work in. To present the challenges, were three speakers, each of whom worked within one of the challenge areas.



Figure 4. Upper left: Iain Shepherd (DG MARE); upper right: Helen Lillis (JNCC); lower left: Helene Hoffmann (Ecologic Institute); lower right: Laurent Dubroca (Ifremer)

3. https://ec.europa.eu/clima/policies/strategies/2050_en

2.1.1 OPEN SEA LAB II CHALLENGES

The 'Marine Environmental Management and Protection' challenge area was presented by Helen Lillis (Joint Nature Conservation Committee - JNCC) (Figure 4) who noted that OSII was an opportunity to develop solutions to better couple our ambitions for blue growth, with those for a healthy marine environment (Figure 5).

Presenting the 'Blue Society and Ocean Literacy' challenge area, Helene Hoffmann (Ecologic Institute) (Figure 4) explained that creating a more ocean literate 'Blue Society' where people are educated and empowered to have a voice in the governance process could contribute to more sustainable and productive oceans (Figure 6).

'Marine Environmental Management & Protection' Challenges

How might we.....

-develop a dynamic tool to create on-the-fly species distribution maps for important marine species?
-quantify the impact of our maritime activities on the seabed for better environmental management?
-develop tools to assess the impact of invasive species on marine ecosystems?

Logos: JNCC, IMEC, etc.

Figure 5. The specific challenges in the area of 'Marine Environmental Management and Protection'

'Ocean Literacy & Blue Society' Challenges

How might we.....

-Create tools, products or services to better inform citizens about the relationship between our activities and our marine environment?
-Develop new ways to make digital resources, such as those available via the European Atlas of the Seas, more accessible for the broad public using mobile applications?
-Empower citizens with tools to help them become ocean stewards and contribute to better ocean governance?

Logos: IMEC, JNCC, etc.

Figure 6. The specific challenges in the 'Ocean Literacy and Blue Society' challenge area

'Sustainable Blue Economy' Challenges

How might we.....

-use vessel data to monitor the environmental footprint of maritime traffic?
-stimulate novel sustainable blue tourism opportunities?
-develop tools to select and /or assess aquaculture sites, now and in the future?

Logos: IMEC, JNCC, etc.

Figure 7. The specific challenges in the 'Sustainable Blue Economy' challenge area

‘Sustainable Blue Economy’ was the final challenge area and was presented by Noémie Wouters (Greenbridge) who drew attention to the EU Blue Economy Report 2019⁴ and noted that data was central to the blue economy and access to open source data represented a real added-value for industry (Figure 7).

In order to address these challenges, technical experts from EMODnet (Pascal Derycke), ICES (Neil Holdsworth) and Copernicus Marine (Fabrice Messal) demonstrated the data, products and services available via their portals and invited potential applicants to explore the diversity of resources, from data and data products on marine litter to underwater noise and from fish trawl surveys to sea ice. Further information on these resources and how they can be used can be found in the respective presentations below:

- EMODnet Data, Products and Services
- ICES Data, Products and Services
- CMEMS Data, Products and Services

A lively panel discussion on ‘Open Data’, moderated by Mathias Van Compernelle (imec), included some of the afternoon’s speakers Conor Delaney, Helen Lillis, Iain Shepherd, Neil Holdsworth. They were joined by Lennert Tyberghein (VLIZ) who stressed the importance of the FAIR data approach, to make data ‘Findable’, ‘Accessible’, ‘Interoperable’ and ‘Reusable’.

The kick-off event concluded with both a retrospective and a future look at Open Sea Lab. Laurent Dubroca, Ifremer, (Figure 4) provided a very amusing ‘Testimony of a Participant’, reminiscing on his experience as a participant at Open Sea Lab 2017. He encouraged anyone thinking of applying to do so and avail of all that was on offer at Open Sea Lab II.

The launch event for EMODnet’s Second Open Sea Lab closed with a ‘Call to Action to Apply’ from Dimitri Schuurman (imec) (Figure 8) who provided a taster of what is to come at OSLII. In a nutshell, anyone with an interest was invited to apply and advised that no previous experience was necessary and diverse backgrounds were welcome. Training would be available on-site and Open Sea Lab represents an opportunity to pick up and learn new skills.



Figure 8. Dimitri Schuurman (imec) warming up the audience and remote listeners for what is to come at OSLII

4. <https://publications.europa.eu/en/publication-detail/-/publication/676bbd4a-7dd9-11e9-9f05-01aa75ed71a1/language-en/>

2.2 The Application Process

Applications opened on 24 May 2019 at <http://www.opensealab.eu/applications>. Applicants were notified that they would receive feedback within one week of submission of their application to allow them to make travel plans in sufficient time to attend the event.

Applicants were invited to submit their names, email, country, a short bio and photo that could be made available on the 'Participants' webpage (Figure 10), their knowledge and skills (e.g. coding language) and a short statement of motivation. They were also asked to indicate which challenge area they were most interested in working on.

All genuine applications were accepted, whilst spaces remained. Where insufficient information was provided, the organising team at VLIZ, who were responsible for all communication with the applicants, followed up to confirm if the application was genuine. Applications remained open until the week before the event when final capacity was reached.

2.3 Participants

A total of 120 people applied to take part in EMODnet's 2nd Open Sea Lab. Of these 33 were students, with the rest comprising diverse backgrounds from both the public and private sector, including data scientists, software engineers, data managers, programmers, policy advisers, communicators and entrepreneurs. Annex 2 provides a list of the applicants' country profiles and backgrounds.

When final numbers were confirmed just before the event, 79 applicants confirmed their attendance, 28 had declined and 9 were unconfirmed. Of the 79 who confirmed attendance their nationalities were as follows: Austria (1), Belgium (24), France (1), Germany (3), Ireland (4), Italy (2), Netherlands (12), Norway (7), Portugal (2), Russia (1), Singapore (1), Spain (1), Sweden (2), Turkey (5), United Arab Emirates (1), UK (11) and USA (1).

Of the 41 who declined their invitation or failed to confirm either way, their nationalities were as follows: Belgium (2), Brazil (1), Germany (1), Ghana (1), Greece (4), India (1), Ireland (1), Israel (1), Italy (1), Morocco (1), Netherlands (2), Norway (1), Portugal (6), Russia (1), Spain (2), Swe-

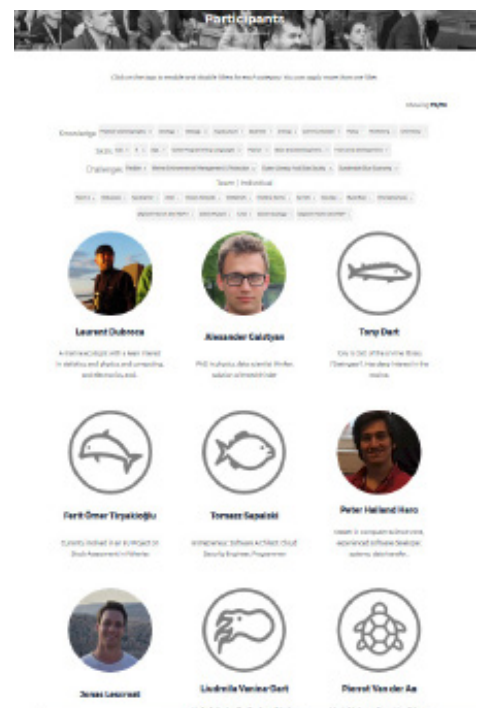


Figure 9. Day 1 of the OSLII hackathon. The participants have gathered for the introductory plenary morning sessions.
Figure 10. Participants' webpage on the OSLII website to profile the applicants and facilitate matchmaking

den (5), Turkey (1), UK (6) and US (3).

Finally, of the 79 confirmed individuals, 69 individuals registered on-site in Ghent, of whom 17 were students. All of the final participants profiles were made available via the Open Sea Lab website (Figure 10) and participants were invited to peruse the page at the following link <http://www.opensealab.eu/participants> in advance of the hackathon in order to get to know each other and identify potential team-mates.

2.4 Coaches

To guide the participants throughout the three-day event, a team of 26 coaches were appointed from the organising institutions (Figure 11). From EMODnet, 13 coaches were present: two from the EMODnet Secretariat, four from VLIZ and EMODnet Biology and at least one coach from each of the other thematic portals. ICES and CMEMS both provided three coaches and imec.living labs appointed seven coaches. In addition to the organisers, coaches were also provided by Global Fishing Watch (one) and OVH⁵ (two), both of whom had been invited to participate in Open Sea Lab and send representatives as speakers, workshop organisers and coaches.

All of the information on the coaches, their skills and backgrounds were gathered and made available on the Open Sea Lab website <http://www.opensealab.eu/speakers> (Figure 12).

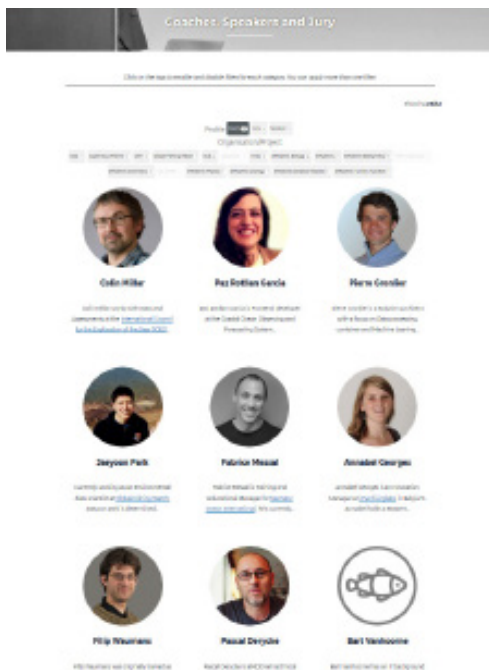


Figure 11. Pascal Derycke (EMODnet Secretariat) introduced the OSLII coaches to the participants. Figure 12. Coaches profiled on the Open Sea Lab website in advance of the event

2.5 Open Sea Lab Programme and Process

2.5.1 DAY 1 – SETTING THE SCENE, FORMING TEAMS AND FORMULATING IDEAS

Day 1 of Open Sea Lab kicked-off with a plenary session for all participants and coaches. Welcoming the participants, Jan-Bart Calewaert (EMODnet Secretariat) explained the background to Open Sea Lab and acknowledged the support of the European Commission's Directorate General for Maritime Affairs and Fisheries (DG MARE). On behalf of the core organising team

5. OVH are Europe's biggest provider of cloud services and have data centres distributed throughout the world <https://www.ovh.com>.

of EMODnet Secretariat, VLIZ and imec, he welcomed also the involvement of CMEMS, ICES and Marine@Ugent as co-organisers in this year's Open Sea Lab, as well as the collaboration with OVH and Greenbridge.

Iain Shepherd (DG MARE) eloquently summarised the challenges facing society in terms of climate change and limiting natural resources and stressed the role the ocean must play in addressing these. Paula Oset Garcia (VLIZ) invited the participants to consider how the three main challenge areas in this year's Open Sea lab were actually all interrelated. The highlight of the morning was a stimulating and enlightening opening keynote from Jaeyoon Park of Global Fishing Watch (Figure 13) on their work to identify IUU fishing activities.



Figure 13. Jaeyoon Park (Global Fishing Watch)

Following the opening welcomes and keynotes, the focus turned to the days ahead as participants were guided through a taster of what was to come by Aron-Levi Herregodts (imec). Explaining the process, Aron-Levi pointed out that there were various routes to the same end (Figure 14). Participants who had arrived in a pre-formed team were welcome to begin work immediately after the Open the Data Session. Individuals were invited to participate in the speed-dating match-making session to help find like-minded partners with complementary skills with whom to form a team. Participants were welcome to work on their own ideas, assuming that they fit into one of the overall challenge areas, or alternatively they could focus on one of the specific challenges.

Aron-Levi then explained that each day had a specific goal. The goal of Day 1 was to form a team, and formulate an idea. The Day 2 goal was to have a first version of a prototype, and the final goal on Day 3 was for each team to pitch their idea and demo to the jury. He further ad-

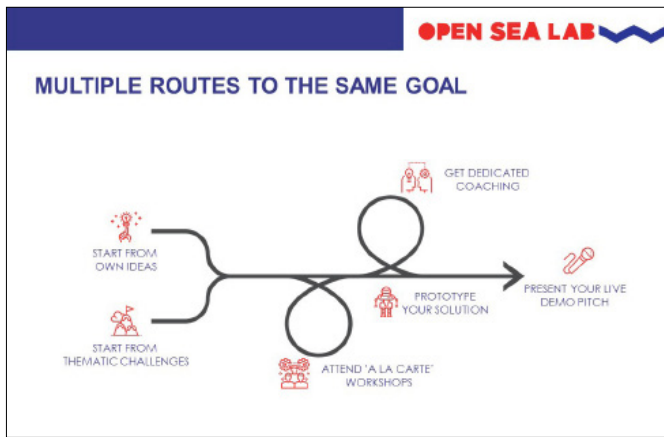


Figure 14. Graphic indicating the routes participants could take during the Open Sea Lab process Figure 15. Three days, three goals: the Open Sea Lab format

vised that coaches would be available throughout the three days to coach the teams and that optional skills workshops (2.5.1.1) were also on offer should participants wish to (further) develop certain of their skills. Finally, Aron-Levi provided participants with some of the simple tips to support their Open Sea Lab journey, for example, learning to recognise the colour coding of the lanyards to distinguish coaches, organisers, participants in teams and participants in need of a team. He also advised the participants to look at the stickers representing the various challenges that could be added to their badges, to indicate their area of interest to other participants for the matchmaking session.

The final segment of the opening plenary session guided the participants through Europe's wealth of marine data. Neil Holdsworth (ICES), Fabrice Messal (CMEMS) and Pascal Derycke (EMODnet) took to the stage to each introduce their data resources and coaches (Figure 16).

In addition, Pascal Derycke (Lead Coach) introduced the participants to the '**hackathon package**'⁶ (Figure 17), a booklet provided to each participant on registration to guide them through the Open Sea Lab. The hackathon package contained information on the process, the coaches and their areas of expertise and most importantly how to access the data, with examples of use cases.



Figure 16. From left to right: Pascal Derycke (EMODnet Secretariat, Neil Holdsworth (ICES) and Fabrice Messal (CMEMS) explaining the vast marine resources on offer.

6. www.opensealab.eu/sites/opensealab.eu/files/public/docs/Hackaton_Package_OSL2019_final.pdf?_t=1569329722



Figure 17. Pages from the Open Sea Lab 'Hackathon Package'



Figure 18. Participants attending one of many workshop sessions

2.5.1.1 Workshop Sessions

Expert-led workshops were open to all participants throughout the hackathon (Figure 18). These optional come-and-go workshops provided an excellent opportunity for the participants to take advantage of the expertise available, to build on their skills or develop completely new ones, as well as to meet new people with similar professional interests.

Whilst there was no obligation to attend the workshops, those participants without a clear idea or project were strongly encouraged to participate in the ideation workshop on Day 1. Brief descriptions of all the workshops available at Open Sea Lab II are listed in Table 1 below. All of the information was also provided in advance on the Open Sea Lab website at <http://www.opensealab.eu/workshops>.

Workshop Name	Description	Organiser
Ideation	'We start from concrete challenge and dig-deeper on the 'How might we questions', through creative techniques we support the teams to arrive at an original idea to use as a main product outcome throughout the hackathon.'	imec
Solution Design	'A proof-tested methodology is used to combine individual ideas and group discussions to arrive at a vision for your potential solution. This solution can then be broken-up and used as a basis for development of your innovative product.'	imec
User Story Mapping	'The relevance of this workshop is twofold 1) it helps to map the bigger picture of your innovative solution & 2) it helps to select focus points to start development. The result of this user story map can be used even after the hackathon to guide potential developments.'	imec
Machine Learning	'Hands-on practical tips, best practices & case example(s) on the use of machine learning to improve the innovativeness of your product.'	imec
Data Visualisation	'Hands-on practical tips, best practices & case example(s) on the art of data visualization.'	imec
The Innovatrix Framework	'An encompassing business framework to map critical assumptions on your innovation idea, assess business, technology & end-user components & decide for focal activities.'	imec
User Testing Workshop	'Learn the ins and outs of iteratively testing your prototype through different user testing methods. Apply this immediately on your product idea.'	imec
How to Pitch	'Hands-on workshop to learn the tips and tricks on presenting an elevator pitch. Peer-to-peer coaching to improve communication & delivery.'	imec
Cloud 101 - Why, and what to do with it? (OVH)	'Discover different technological use cases of workloads in the Cloud, and how to operate them easily.'	OVH
5 reasons why you should process your data at scale using European based cloud services, reason 4 will take your breath away (OVH)	'A walk through the different options for storing data and various tools for processing data: from building your own Distributed File System or using a managed Spark cluster up to a one click data value extraction with Automatic Machine Learning. During the workshop, participants and experts from OVH explore some of the main advantages of processing data at scale using OVH services as example. This workshops illustrates how to efficiently process data while allowing users to keep control over their data governance and costs.'	OVH
MSP Challenge Simulation Platform (MSP Challenge Team)	'The MSP Challenge digital interactive simulation platform is the next generation of maritime spatial planning. It helps planners and stakeholders understand and manage the complexity of maritime spatial planning and uses the best available data in Europe. In this workshop the creators introduce the game and provide a demonstration of how it works. Interested participants have the opportunity to 'play' the game themselves after this demo workshop'	MSP Challenge Simulation Platform Team

Table 1. Open Sea Lab workshops, descriptions and organisers

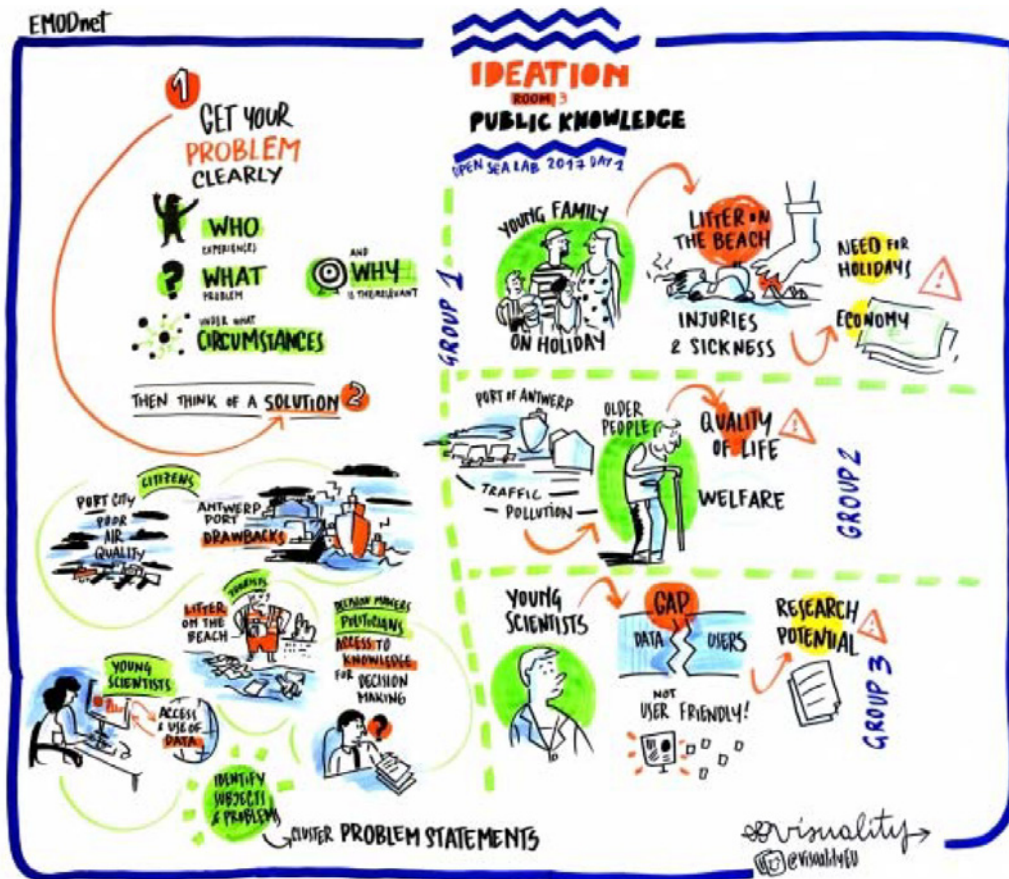


Figure 19. Visual of the ideation workshop during OSL I by visuality.eu

The afternoon of Day 1 involved matchmaking of the participants into 16 teams based on shared challenge interests and complementary abilities. The 16 teams, with names ranging from the imaginative, ‘Finding demo’, ‘Byte Bear’ and ‘Oil Busters’ to the visionary, ‘Changing Seas’ as well as the more prosaic, ‘Team 4’ and ‘Ilvo’, quickly got to work and wasted no time in advancing their ideas. Workshops in ideation and story-telling by the unflappable experts from imec.living labs helped the teams shape their emerging ideas into potential real-life solutions. All of the teams and their concepts are listed in Table 2. The team of coaches from EMODnet, ICES, CMEMS, VLIZ and imec, provided round-the-clock support and were easily identifiable by their T-shirts, blue lanyards and thirst for data problems (see Figure 11).

2.5.2 DAY 2 – DEVELOPING IDEAS INTO PROTOTYPES

The beginning of Day 2 saw the emergence of preliminary prototypes. More workshops in machine learning, data visualisation and user testing left some participants feeling spoiled for choice. Even some of the coaches tried to sneak into workshops incognito to pick up a few tips (Figure 20). Many of the teams worked late into the night, supported only by reinforced internet connection and pizza.

2.5.3 DAY 3 – PITCHES, JURY AND AWARD CEREMONY

The final day of Open Sea Lab II dawned crisp and clear in Ghent as the nervous teams joined one final workshop to polish their presentation skills before pitching their creations to the Open Sea Lab jury panel. Hans Pirlet (VLIZ), who had been centrally involved in developing the Open Sea Lab concept, chaired the closing session. Andy Kontoudakis (DG MARE) (Figure 21) welcomed ‘a wonderful and diverse’ crowd of participants and stressed the importance of providing fertile ground, such as Open Sea Lab, to foster innovation because innovation happens when the opportunities are there. In addition to the team pitches, two inspiring key notes were provided, the first by Katja Mayer⁷, University of Vienna, on ‘Big Open Data: Challenges and

7. Speakers presentations can be found in the programme for the closing session on the Open Sea Lab website <http://www.opensealab.eu/programme2019>.

Team Name	Concept
Byte Bear	Interactive educational app linking choices humans make in their daily life to the environmental impact of these activities
ILVO	Interactive fish stock assessment tool' to allow non-specialists
Team 4	Public awareness tool of key fish species status to inform responsible consumption.
Zebra Muscle	A dynamic decision-making tool for safe dumping of ship ballast waters, to reduce invasive species distribution
Oilbusters	Open, public oil spill detection service
Changing Seas	Educational augmented reality app to help families make responsible choices to protect their marine environment
Seeing Ear	Virtual bathyscope, an app to simulate an ocean dive for blind and partially sighted people
Digital Twin North Sea1	Tool to demonstrate suitability maps for wind farms siting
Digital Twin North Sea2	Interactive visualisation tool showing the environmental impacts of a windfarm over time, to increase stakeholder engagement and support more holistic decision making
Py Fish	Tool to support responsible fishing to by developing maps of most suitable areas to fish in a sustainable way
Ocean Wizards	Tool to show impact of vessel traffic on some key marine species
Finding Demo	Tool to help divers record and report new sightings of invasive species
I-Fish	Tool to assist enforcement officers to carry out control tasks for overfishing
Ocean Ecology	Tool to enhance in situ survey data using open data portals
Overlap	Predictive tool for industry or policy makers to determine the impact of a new human activity on species on the seabed
CODeFish	Tool to provide near-future decision support for fisheries

Table 2. The 16 teams taking part in Open Sea Lab and the concepts that they developed during the three-day event.



Figure 20. Teams hard at work developing their prototype;



Figure 20. Upper left: participants and coaches attending the drop-in workshops at Open Sea Lab; lower left: user story mapping workshop; Right: well-deserved lunch break.



Figure 21. Andy Kontoudakis (DG MARE).



Figure 22. The Open Sea Lab jury members.

Opportunities’, and the second by Koen Geirneart, dot Ocean, on ‘The Innovation Potential of Open Data for Autonomous Systems’. Katja Mayer congratulated EMODnet on the advances they had already made and provided some food for thought on its future development with her ideas for ‘EMODnet meta.’

Each of the 16 teams (Table 2) was allowed a five-minute slot within which to pitch their idea and showcase their demo. They were advised in advance that they would be judged on both their pitch and their demo.

Finally, the panel of jurors retired to reach their verdicts and noted the difficulty they had in reaching them, given the quality of some of the pitches and demos. In addition to the overall prizes, Noémie Wouters (Greenbridge), Pierre Gronlier (OVH) and Tina Mertens (VLIZ) generously awarded their own prizes on behalf of their organisations.

Jury, Judging and Prizes

The Open Sea Lab Jury members comprised experts drawn from DG MARE, the organising institutions as well as invited members from OVH and Global Fishing Watch (Figure 22).

Imec coordinated the judging process, briefing all jury members in advance and provided them with an evaluation sheet (Table 3, below). The audience were also invited to participate in the jury process and for this reason sli.do (<https://www.sli.do/>), an online polling and Q&A platform was used to allow the audience to score each pitch. These scores were combined with the jury scores to agree an overall first, second and third place team who each received vouchers for online learning platforms, O Reilly (<https://www.oreilly.com/>) and SuperDataScience (<https://www.superdatascience.com/>)

In addition to the overall prizes, VLIZ, Greenbridge and OVH all awarded their own prizes to teams of their own choosing.

2.5.4 RESULTS

The overall winner of Open Sea Lab II 2019 was ‘Team Ilvo’, with their ‘interactive fish stock assessment tool’ to allow non-specialists to understand and interpret fisheries data (Figure 23). Their aim was to make the vast amount of open fish stock data findable and understandable for a wider audience. Recognising that much information already existed, team Ilvo pointed out that some was hard to interpret for non-specialists, while others sources of information may not be built on scientifically sound assessments.

In second place were Team ‘Digital Twin North Sea II’ with their interactive visualisation tool showing the impacts, over time, of building a windfarm, to support more holistic decision-making. And third place went to Team ‘Byte Bear’ for their interactive educational app linking choices humans make in their daily life to the environmental impact of these activities, visualized by a polar bear avatar.

The VLIZ award went to CODEFISH for their tool to provide near-future decision support for fisheries.

OVH awards went to, in first place, again team CODEFISH, in 2nd place were team ‘Finding Demo’ for their tool to help divers record and report new sightings of invasive species, and 3rd place went to OILBUSTERS for their open, public oil spill detection service.

The Greenbridge award, went to ‘Changing Seas’ for their educational augmented reality app to help families make responsible choices to protect their marine environment.

Webcasts of the opening and closing sessions of Open Sea Lab can be found on the Open Sea Lab website at <http://www.opensealab.eu/stream>.

Team Name	0 points	1 point	2 points	30 points	Score
Relevance to challenges <i>How well does the idea/solution correspond to one of the OSL challenge areas</i> -Sustainable Blue Economy -Marine Environmental Management & Protection -Ocean literacy & Blue Society	<i>Not relevant</i>	<i>Only limited links to the themes</i>	<i>Some links to the themes</i>	<i>Completely match with one or more challenges</i>	
Significance <i>How well does the idea/solution addresses a real need or problem?</i>	<i>Not significant</i>	<i>Only nice to have</i>	<i>Corresponds with some contribution to a real societal need</i>	<i>Corresponds significantly with significant contribution to a real societal need</i>	
Innovativeness <i>Indicate the innovativeness/newness of the idea/solution</i>	<i>Not innovative at all</i>	<i>Some loose elements are new</i>	<i>Original, but replicable</i>	<i>Completely out-of-the-ordinary, original, new</i>	
Technical maturity <i>Indication of the technical maturity/quality of the demo</i>	<i>No Demo was shown</i>	<i>Only limited technical maturity</i>	<i>Technically functioning product</i>	<i>Significant technical maturity</i>	
Business Potential <i>What is the business potential of the idea/solution</i>	<i>No business potential, no mention of business model</i>	<i>Business model is mentioned, not detailed</i>	<i>Business model is missing some key elements</i>	<i>Clear business model is mentioned</i>	
TOTAL SCORE:					

Table 3. Open Sea Lab Jury Evaluation Sheet



Figure 23. Team Ilvo presenting their 'Interactive fish stock assessment tool' during the pitch presentations session.



Figure 24. Upper left: Ilvo receiving the overall award; upper right: CODeFISH awarded by VLIZ; lower left: CODeFISH awarded by OVH; lower right: Changing Seas awarded by Greenbridge.

3 Open Sea Lab III?

EMODnet's first Open Sea Lab had 48 applications and, in the end, five teams competed. The second OSL, saw that number grow to 120 applications with finally 16 teams competing. Some applicants returned for a second go, which highlights what a positive experience participating in OSL is. Open Sea Lab could therefore continue to grow into the future, with possible European and global nodes participating remotely. This could address the issue of costs for overseas applicants who wish to participate. It will however not be possible to fully experience the spirit and camaraderie, as well as the learning opportunities of Open Sea Lab without being on-site during the event.

Thoughts must turn now to how build on the outcomes of this year's OSLII and on the open, innovative and diverse spirit that it nurtures. To this end, a survey has been extended to all participants to gather their feedback. The organising institutions have been gathering their own feedback to ensure that plans for any future Open Sea Lab build on the positive outcomes and lessons learned from EMODnet's Second Open Sea Lab.



Figure 25. The Zebrastraat venue for Open Sea Lab II

4 Annexes

Annex 1 - Programme of EMODnet Open Sea Lab II hackathon 2019

Day 1 - Wednesday 4 th September 2019		
08:00-09:00	<i>Registration</i>	
Welcomes and opening session @Ned Kahn		
	Session Chair	<u>Oonagh McMeel</u> , EMODnet Secretariat
09:00-09:20	Welcomes: European Commission, Directorate-General for Maritime Affairs and Fisheries (DG MARE) <u>Welcome by EMODnet Secretariat</u> <u>Welcome by Flanders Marine Institute (VLIZ)</u>	<u>Iain Shepherd</u> , DG MARE <u>Jan-Bart Calewaert</u> , EMODnet Secretariat <u>Paula Oset Garcia</u> , VLIZ
09:20-09:40	A look inside the EMODnet engine room	<u>Belén Martín Míguez</u> , ECIMAT, University of Vigo
09:40-10:10	Keynote: <u>Data-driven innovation for transparency in global fisheries</u>	<u>Jaeyoon Park</u> , Global Fishing Watch
10:10 - 10:40	<i>Coffee break and networking</i>	
10:40-10:50	<u>OSL II: what's on offer</u>	<u>Aron-Levi Herregodts</u> , imec
10:50-12:15	<u>Hack.Play.Break</u> <u>The Copernicus Marine Service</u> <u>EMODnet Open the Data</u>	<u>Neil Holdsworth</u> , ICES <u>Fabrice Messal</u> , CMEMS <u>Pascal Derycke</u> , EMODnet
12:15 -13:30	<i>Networking lunch & matchmaking</i>	
Open Sea Lab		
13:30-14:45	Workshop: <u>Ideation Session & matchmaking (imec)* @ Ervink, Honore & Panamarenko</u>	Coaching (imec) - <u>Innovatrix as an innovation structuring process</u>
14:45-16:00	Workshop: <u>Solution Design (imec)* @ Ervink, Honore & Panamarenko</u>	Working on team projects - workstations available
16:00-17:30	Free time for newly formed teams to begin working on team projects	
17.30-18:30	Demo: <u>MSP Challenge Simulation Platform* @XYZ lounge</u>	
18.30-19:30	Cocktail / Refreshments & play the <u>MSP Challenge Simulation Platform game*</u>	
20:30-21:30	Side event: <u>'Ghent by Night' guided excursion (optional)*</u>	

**Workshops, demos and events will enhance your experience but are optional, workstations remain open for those teams who wish to continue working.*

Day 2 - Thursday 5 th September 2019		
Open Sea Lab part II		
08:30-09:00	<i>Kicking off the day with coffee and work stations available</i>	
09:00-10:00	<u>Cloud 101 - Why, and what to do with it (OVH)* @Ned Kahn</u>	
		Optional Parallel Workshops*

Room	@ Ervink	@ Honore	@ Panamarenko
10:00-11:15	<u>Machine Learning (imec)*</u>	<u>User story mapping (imec)*</u>	<u>User story mapping (imec)*</u>
11:15-12:30	<u>Machine Learning (imec)*</u>	<u>User story mapping (imec)*</u>	<u>User story mapping (imec)*</u>
12:30-13:30	<i>Networking lunch</i>		
13:30-14:45	<u>Data Visualization (imec)*</u>	<u>User Testing (imec)*</u>	<u>User Testing (imec)*</u>
14:45-16:00	<u>Data Visualization (imec)*</u>	<u>User Testing (imec)*</u>	<u>User Testing (imec)*</u>
16:00-17:00	Working on team projects		
17:00-18:00	<u>5 Reasons why you should process your data at scale using European based cloud services, reason 4 will take your breath away (OVH)* @Ned Kahn</u>		
18:00-20:00	Food truck and refreshments*		

Note that this is a draft of the agenda and subject to change

*Workshops, demos and events will enhance your experience but are optional, workstations remain open for those teams who wish to continue working.

Day 3 - Friday 6th September 2019

Open Sea Lab part III

08:30-09:00	<i>Kicking off the day with coffee and work stations available</i>	
09:00-09:30	Working on team project - workstations available	
09:30-10:45	Workshop: <u>How to Pitch (imec)* @ Ervink</u>	Teams finalize project - pitch preparation
10:45-12:00	Individual feedback on Team Pitch	
12:00-13:30	<i>Networking lunch</i>	
Pitch presentations, closing and awards ceremony @Ned Kahn		
13:30-13:45	Welcomes and Opening Address Flanders Marine Institute European Commission, Directorate-General for Maritime Affairs and Fisheries	<u>Hans Pirlet, VLIZ</u> (Session Chair) <u>Andy Kontoudakis, DG MARE</u>
13:45-14:05	Keynote: Big Open Data - Challenges & Opportunities	<u>Katja Mayer, University of Vienna</u>
14:05-16:05	Team Pitches – presentation of OSLII innovations (pitch, demo, Q&A)	<u>Dimitri Schuurman</u> and <u>OSL2019 Teams</u>
16:05-16:35	Coffee break and jury deliberations	
16:35-17:00	Keynote: The innovation potential of Open Data for autonomous systems	<u>Koen Geirnaert, dotOcean</u>
17:00-17:30	Prize ceremony and closing - Greenbridge Prize - OVH Prize - VLIZ Prize - Overall Prizes	<u>Noémie Wouters, Greenbridge</u> <u>Pierre Gronlier, OVH</u> <u>Tina Mertens, VLIZ</u> <u>Jan-Bart Calewaert, EMODnet Secretariat</u>

Annex 2 – Applicant’s country profiles and background.

Country	Occupation or Qualification
Austria	MSc in marine biological resources
Belgium	PhD student in Oceanography
Belgium	MSc. Marine Biological Resources (IMBRSea)
Belgium	Student
Belgium	Masters students in Marine sciences
Belgium	MSc, Recently graduated
Belgium	Software development
Belgium	Solution Architect
Belgium	DDD and development
Belgium	Scrum master
Belgium	Msc in Marine Biological Resources (recently graduated)
Belgium	Date, AI
Belgium	Project Manager in VLIZ Marine Data Centre for Local Sevices & Projects
Belgium	Science Officer
Belgium	data manager at OBIS (IOC-UNESCO, IODE)
Belgium	data manager at EurOBIS (Science Officer)
Belgium	Science Officer performing data management for OBIS and GIS product developing for EMODnet
Belgium	Fisheries scientist
Belgium	Software developer
Belgium	.NET developer
Belgium	data manager
Belgium	Data Scientist
Belgium	Head of Innovation
Belgium	MSc in Marine biological resources
Belgium	biotechnologist/senior scientist
Belgium	na
Belgium	Science journalist, specialty marine science
Brazil	Research Software Engineer
France	Marine Ecologist
Germany	phD student
Germany	Master’s Student in Marine Geosciences
Germany	Data Scientist
Germany	Maritime Planning and Policy Consultant
Ghana	Student
Greece	Captain b class & Naval Architect
Greece	Rescuer
Greece	Biologist
Greece	Diver

India	Software Engineer
Ireland	Business Studies Student
Ireland	Fisheries Data Manager
Ireland	PhD in Fisheries Science, BSc in Applied Ecology, Director of Education at GA, co-secretariat at Irish Ocean Literacy Network
Ireland	software architect
Ireland	GIS
Israel	PhD Candidate in Marine Geoscience
Italy	PhD
Italy	IT Technician
Italy	assistant professor
Morocco	Geomatician
Netherlands	Marine biology student with a special interest in fisheries science (IMBRSea student)
Netherlands	Programmamanager Informatiehuis Marien
Netherlands	Background in geo-information management
Netherlands	policy advisor and data scientist
Netherlands	Software Engineer
Netherlands	researcher
Netherlands	Trainee Rijkswaterstaat
Netherlands	Junior researcher (Deltares)
Netherlands	datavisualisator
Netherlands	researcher
Netherlands	datascientist
Netherlands	Environmental and GIS Consultant Magali is a Environmental and GIS consultant who compiled the geo-data for the MSP Challenge Simulation Platform and linked it to a ecological model
Netherlands	Game Designer
Netherlands	Programmer
Norway	Master student in the field of International Fisheries Management at UiT
Norway	MSc, Computer Scientist, Systems developer,
Norway	MSc student, computer science
Norway	PhD, Research Scientist
Norway	MSc, Computer Scientist, Researcher
Norway	MSc student , computer science
Norway	PhD
Norway	Scientific programmer
Portugal	Research Assistant at Leibniz Institute for Baltic Sea Research
Portugal	Master's degree in Marine Conservation and Ecology (by the IMBRSea Programme)
Portugal	researcher of MIT seed project on Deep-sea soundscaping
Portugal	PhD student
Portugal	PhD student
Portugal	PhD student
Portugal	Researcher
Portugal	Researcher/Consultan

Rusia	Machine learning researcher
Russia	Marine GeoScientist
Singapore	IMBRSea Degree
Spain	Fresh IMBRSea MSc awarded in search of job
Spain	Researcher in marine biogeochemistry
Spain	Developer and CEO
Sweden	PhD Student
Sweden	Researcher
Sweden	Oceanography
Sweden	Oceanography
Sweden	Ocean modeling
Sweden	Ocean modeling
Sweden	System Developer
Turkey	Computer Engineer, Msc.
Turkey	Coordinator
Turkey	Aquaculture Engineer Msc
Turkey	Fisheries Engineer
Turkey	European Union Expert
Turkey	Biologist
United Arab Emirates	Data Scientist
United Kingdom	PhD Student in Naval Architecture
United Kingdom	PhD Student
United Kingdom	BSc. Bioscience
United Kingdom	Graduate student
United Kingdom	Software/Electronics/Web Engineer
United Kingdom	Postdoctoral Research Associate
United Kingdom	Scientist (PHD)
United Kingdom	Senior Developer
United Kingdom	Senior Marine Ecologist
United Kingdom	Senior Developer
United Kingdom	Software Engineer
United Kingdom	CEO, Programmer
United Kingdom	Data Analyst
United Kingdom	Post-doctoral researcher
United Kingdom	Marine Scientist
United Kingdom	Data Services Lead at Ocean infinity
United Kingdom	GeoSpatial Web Systems, MSc in GIS
United States	PhD candidate in fisheries
United States	Graduate Student, MIT Media Lab
United States	AI graduate researcher at MIT
United States	MIT Computer Science Student Studying Machine Learning.

The organisers of Open Sea Lab would like to extend a sincere thank you to everyone who took part and contributed to making Open Sea Lab the success that it was.

Until next time, check out <http://www.opensealab.eu/data2019> and see what you can create with marine open data!