



Programme &
Book of Abstracts



The fourth conference of the European Marine Science Educators is held in Belfast. Taking place over 4 days (4 - 7 October 2016), the conference incorporates a programme of keynote speaker(s), parallel and workshop sessions, open space discussions and networking opportunities followed by a selection of exciting field trips around Northern Ireland on the final day.

Titanic Belfast

1 Olympic Way, Queens Road
Titanic Quarter, Belfast BT3 9EP, UK



Conference Organising Committee



Susan Heaney
Blue Inspiration
P.O. Box 2177, Belfast BT5 9FL
info@blue-inspiration.co.uk
www.blue-inspiration.co.uk



Fiona Crouch
Marine Biological Association – MBA
The Laboratory, Citadel Hill
Plymouth, PL1 2PB, Great Britain, United Kingdom
ficr@MBA.ac.uk
www.mba.ac.uk



Peter Tuddenham
College of Exploration
2 Victoria Drive Mudeford, Christchurch Dorset
BH23 3LF England, UK
peter.tuddenham@coexploration.co.uk
www.coexploration.co.uk



Evy Copejans
Flanders Marine Institute – VLIZ
InnovOcean site, Wandelaarkaai 7
8400 Oostende, Belgium
evy.copejans@vliz.be
www.vliz.be



Géraldine Fauville
University of Gothenburg - UGOT
Department of Education, Communication and Learning (IPKL)
Sweden
geraldine.fauville@gu.se

Sponsors



EMSEA Secretariat

Marine Biological Association – MBA
The Laboratory, Citadel Hill
Plymouth, PL1 2PB, Great Britain, United Kingdom
<http://www.emsea.eu>

Programme

Tuesday 4th October			
08:30	Registration		North Viewing Gallery
09:30	Opening plenary session and adoption of agenda		Titanic Suite
10:00	Keynote 1	Ivan Conesa-Alcolea, European Commission, DG Research & Innovation, Marine Resources	
10:40	Keynote 2	David Cline, US Aquaculture Society president	
11:10	Coffee break		North Viewing Gallery
11:40	Industry / Local speaker 1	Robert Hill & Eleanore Thomas (NI Space Office & CCEA)	<i>How Space Science Technology was integrated in Northern Ireland's secondary curriculum</i>
12:00	Industry / Local speaker 2	Robert Holland, Oil Spill Response	<i>Stakeholder engagement – how the oil industry conveys good practice</i>
12:15	Flash poster presentations	Tamer Fawzy, ResponSEable: Ocean Literacy - <i>The knowledge system of Europe's Seas</i>	
		Meghan Marerro, Mercy College: <i>Exemplary Practices in Marine Science Education (book)</i>	
		Fabio Araujo, Universidade do Estado do Rio de Janeiro: <i>Scientific divulgation through environmental education</i>	
		Weronika Podlesinska, Gdynia Aquarium: <i>Bringing teachers closer to the sea: the Blue Academy</i>	
		Denise Goldsmith, CEFAS: <i>Ocean Literacy initiatives at CEFAS</i>	
		Sonya Lee, Canadian Network for Ocean Education (CaNOE): <i>An overview of the current ocean education landscape in Canada</i>	
		Ana Pinto, ZSL: <i>Building and fostering ocean literacy through conservation in context</i>	
12:45	Lunch, poster session		(North Viewing Gallery) and visit to STEM module (outside)
14:00	Parallel session 1	A. Bringing Marine Science into formal and informal education settings (student targeted) Olympic Suite	B. Bringing Marine Science into formal and informal education settings (non-student targeted) Britannic Suite
	14:00 - 14:15	Joanna Henley, Sciart Solutions (UK): <i>Marine science arts interpretation</i>	Thomas McCloughlin, Dublin City University (IRL): <i>Holding back the tide: Ocean literacy in primary student teachers</i>

	14:20 - 14:35	Angela Lodge, University of South Florida (USA): <i>Doing science like an ocean scientist: Ocean immersion programs to engage students and teachers outside the classroom - At sea, in labs, in the field</i>	Susanna Lincoln, CEFAS (UK): <i>What are the barriers to teaching children about the Ocean? Results from a Consultation in the UK</i>
	14:40 - 14:55	Ana Pinto, Zoological Society of London (UK): <i>Building and fostering ocean literacy through conservation in context</i>	Grazyna Niedoszytko, Gdynia Aquarium (POL): <i>Ocean literacy from the scratches - Polish example</i>
	15:00 - 15:15	Emily Readman, Marine Biological Association, (UK): <i>Success in bringing marine science into formal and informal education settings</i>	Anne Ruddy, RedRose Developments (IRL): <i>Schools Pilot - Introducing Ocean Science into Mayo Schools</i>
	15:20 - 15:35	Andreu Dalmau, SUBMON (SPA): <i>"Mar Interior": an ocean literacy route among schoolchildren from Spanish landlocked regions</i>	Meghan Marerro, Mercy College (USA): <i>Incorporating authentic ocean data into formal classroom instruction: Implications for student engagement and scientific practice.</i>
15:40	Coffee break		North Viewing Gallery
16:00	Workshop session	Workshop 1 Titanic Suite	Workshop 2 Olympic Suite
		From Fishing to Farming: Aquaculture - Vanessa Batista (co-sponsored by H2020 SeaChange & AORA-CSA projects)	Open data & opportunities for Ocean Research - Luc Zwartjes (EUROGEO) Note: Bring own device
18:00	Conference finishes for the day		
Wednesday 05 October			
09:00	Parallel Session 2	A. EMSEA-Med specific work Olympic Suite	B. OL Principle 6: Oceans & Human Health – What will be our legacy? Britannic Suite
	09:00-09:15	Giulia Realdon, UNICAMearth (ITA): <i>Ocean Literacy from the Arctic to the Mediterranean: My experience as a "Teacher at Sea"</i>	Teresa Greely, University of South Florida (USA): <i>Measuring Ocean Literacy: What teens understand about the ocean using the survey of ocean literacy and engagement (SOLE)</i>

	09:20-09:35	Martha Papathanassiou, Hellenic Centre for Marine Research (GRC): <i>PERSEUS Ambassadors: The voice of the younger generation towards Clean Seas</i>	Gail Scowcroft, University of Rhode Island (USA): <i>Global Ocean Science Education: Results from the Second International Workshop</i>
	09:40-09:55	Carol Campbell, S'Agulla (ESP): <i>Oceans, an international educational project for students aged 12-16. Introducing ocean literacy from the student's experience</i>	Fiona Crouch, MBA: <i>Sea Change – Resources for Marine Educators</i>
	10:00-10:15	Francesca Santoro, UNESCO: <i>The Mediterranean Sea Literacy: a collaborative and innovative effort to promote sustainable development in the region.</i>	
10:20	Flash poster presentations		Titanic Suite
		Antonios Pappantoniou, Housatonic Community College: <i>Digital Colleting: Use that smartphone for more than just texting!</i>	
		Jordi Sanchez, SUBMON: <i>Digesting MSFD and GES to be easily incorporated to primary and secondary syllabus</i>	
		Jose Teixeira, CIIMAR: <i>Ocean action art & science approaches to raise awareness about plastic marine debris</i>	
		Owen Molloy, University of Ireland, Galway: <i>What do we need to know to act to improve the state of the oceans: example of the ResponSEable human-ocean knowledge system</i>	
		Mark Ward, Field Studies Council: <i>Using information technology to enhance rocky shore fieldwork</i>	
		Amy Collard, Field Studies Council: <i>Evaluating the success of Marine Science Camps: Improving the provision of marine science education opportunities in post-16 students</i>	
		Kate Shilliday, University of the Highlands and Islands: <i>Perception of drug pollution of the aquatic environment among European medical professionals</i>	
10:50	Coffee break		North Viewing Gallery
11:15	Open space topic suggestions		Titanic Suite
12:15	Lunch and poster session		North Viewing Gallery
13:30	Open space sessions		Titanic, Olympic & Britannic Suites
15:30	Coffee break		North Viewing Gallery
16:00	Open space reporting		Titanic Suite
19:30	Drinks reception (Optional. No charge to attend)		City Hall

Thursday 06 October

09:00	Parallel session 3	A. Blue Growth in Industry Olympic Suite	B. TransAtlantic work Britannic Suite
	09:00 - 09:15	Manuela de los Rios, Community of Arran Seabed Trust (UK): <i>Bridging the gap between ocean literacy and good ocean governance: the Community of Arran case study</i>	Geraldine Fauville, University of Gothenburg (SWE): <i>Inquiry to Student Environmental Action</i>
	09:20 - 09:35	Francesca Santoro: <i>World Oceans Day – new interactive portal</i>	Craig Strang, Lawrence Hall of Science (USA): <i>Communicating ocean science for Informal Education course launched in Europe</i>
	09:40 - 09:55	Racquel Costa, Task group for the Extension of the Continental Shelf (EMEPC) (PRT): <i>"Bridges between school and Blue Science" as told by a high school student</i>	Sonya Lee, CANoE (CAN): <i>Tide to Technology: A science centre working with marine industry to advance ocean and career literacy in Nova Scotia, Canada</i>
	10:00 - 10:15	Rosemary McCloskey, Loughs Agency (UK & IRL): <i>Contributing to Blue Growth in Industry</i>	Richard Baldwin, Educational Passages (USA): <i>Transatlantic mini-boat project</i>
	10:20 - 10:35	Tim Deprez, Marine Training Platform (BEL): <i>MarineTraining.eu: The one-stop-shop for marine education and training</i>	Diana Payne, University of Connecticut (USA): <i>The day Christmas came to Copenhagen International School</i>
	10:40 - 10:55	Rita Rocha, AlgalFit (FRA): <i>The AlgalFit project</i>	Geraldine Fauville, University of Gothenburg (SWE): <i>Development of an International Open Source Instrument to measure ocean literacy</i>
11:00	Coffee break North Viewing Gallery		
11:30	Workshop session	Workshop 4 Olympic Suite	Workshop 5 Britannic Suite
		Adapting whales to teach food chains - A pilot program connecting formal and informal education - Robert Rocha, New Bedford Whaling Museum	What the VAK (visual, auditory, kinaesthetic) with marine science - a multisensory approach to marine education - Dominika Wojcieszek, Gdynia Aquarium
12:30	Lunch and poster session North Viewing Gallery		
13:30	Concluding remarks Titanic Suite		
15:00	Conference ends		

15:00	<p>First Irish Ocean Literacy Network meeting (closed meeting – attendance via registration only)</p> <p>Tour of Titanic Belfast</p>	<p>Olympic Suite</p> <p>Meet in Titanic Suite</p>
19:00	<p>Conference dinner within Titanic Belfast (Optional. Partners may also attend. Additional charges apply.)</p>	<p>The Bridge</p>
Friday 07 October		
09:00 - 17:00	<p>Field trips (Optional. Partners may also participate. Additional charges apply.)</p>	

Abstracts

(in order of presentation)

Abstracts Tuesday, October 4th

10:00 Keynote 1

Ivan Conesa-Alcolea, European Commission, DG Research & Innovation, Marine Resources

10:40 Keynote 2

David Cline, President, US Aquaculture Society

11:40 Industry / Local Speaker 1

How Space Science Technology was integrated into Northern Ireland's secondary curriculum

Robert Hill¹, Eleanore Thomas²

¹*Northern Ireland Space Office*

²*CCEA (Council for the Curriculum, Examinations and Assessment, NI)*

There are numerous excellent examples of exciting and interactive STEM related resources available to teachers and students. These activities encourage and inspire our next generation to engage with STEM and explore science in fun and innovative ways. However, schools tend to use these resources for after school activities or STEM enhancement and enrichment activities rather than mainstream resources for classroom teaching. Such activities are often viewed as having no currency in the accreditation and assessment process and thus are marginalised.

Northern Ireland has created the Space Science Technology qualification. This is first space STEM related vocational qualification available anywhere in Europe where teachers can use space resources to help students attain UK recognised certification. This presentation will highlight the engagement journey and process with industry and accreditation authorities to justify the creation of such a specification as a relevant STEM and skills related qualification to prepare our next generation for further study and the world of work.

12:00 Industry / Local Speaker 2

Stakeholder engagement – How the oil industry conveys good practice

Robert Holland

Oil Spill Response

12:15 Flash poster presentations

Ocean Literacy – The Knowledge System of Europe’s Seas

Tamer Fawzy
ResponSEAble

Our knowledge on how people influence the oceans is growing. So is the education and communication about this topic: Many stakeholders give input about it through different channels. Today’s ocean literacy is dependent on a multitude of communication channels, multipliers and media types. Unfortunately, making people more aware of ocean issues does not necessarily mean they change their behavior in favor of healthier oceans. So the overall question of H2020 ResponSEAble is: which information do different stakeholders need, so that it taps into their value sets and they start feeling responsible for the oceans, so that they become more inclined to change their behavior? How has knowledge about the ocean been communicated? Which stories have been told and in what format? What campaigns or media products were more effective and why? ResponSEAble is a unique European project (Horizon 2020) combining the efforts of 15 partners, 11 countries, consisting of marine biologists, sociologists, economists and even artists.

With a poster presentation we want to present the results from our assessment of the use of information mechanisms on different marine issues in the regional seas of Europe. As these results will be part of the basis for the development of our own ocean literacy materials, we hope for fruitful discussions with the participants of the event.

Exemplary Practices in Marine Science Education

Meghan Marerro
Mercy College, USA

This poster will share progress on our upcoming Springer Publications edited book: *Exemplary Practices in Marine Science Education: A Resource for Practitioners and Researchers*. The book invites chapter authors involved in Ocean Literacy from across the globe to share their exemplary best practices in marine science education.

Purpose of the Book: Our purpose is to inform, inspire, and provide an intellectual forum for practitioners and researchers in this particular context. Proposed subject areas include sections on marine science education in formal, informal and community settings. Please note that we are NOT interested in lesson plans as a part of this publication.

Primary Audience: Marine science education practitioners (e.g., formal and informal educators) and researchers (both education and science). The book will contribute to a global conversation about marine education, and allow practitioners in the field to learn of the successes of colleagues near and far, and to share research and evaluation data, mediating the gap in published literature in this field.

Praia limpa é a minha praia: Scientific divulgation through environmental education

Melanie Lopes da Silva¹, Rebeca Oliveira Castro¹, Caroline Souza de Andrade², Alain Alves Póvoa², Fábio Araújo².
¹*Universidade Federal Fluminense – Programa de Pós Graduação em Biologia Marinha e Ambientes Costeiros;*
²*Universidade do Estado do Rio de Janeiro - Faculdade de Formação de Professores.*

“Praia limpa é a minha praia” (Clean beach is my beach) is a project of Teacher Training College of the University of State of Rio de Janeiro, Brazil, which aims to impart the knowledge obtained in researches about marine debris and microbiological quality of water to students and teachers of public and private schools, as well as fishermen,

merchants, ship owners and frequenters of marine environments, to create in these ones awareness to preserve these environments through individual and community practices of conservation that culminate in improving the places where they live and attend. Environmental education activities as lectures, production and distribution of informative material and ludic activities are realized both in formal and informal spaces. The increasing in public participation and invitations for partnerships and to carry out activities in the most diverse spaces show that the goal of raise awareness and create interest in the preservation of coastal environments has been achieved satisfactorily, showing that scientific divulgation through environmental education is one of the paths to the formation of critical individuals responsible for the environment where they live.

Bringing teachers closer to the sea: the Blue Academy

Weronika Podlesińska, Grażyna Niedoszytko

National Marine Fisheries Research Institute, Gdynia Aquarium Education Center, Poland

Teachers are fundamental in modelling ocean literated society, as they significantly influence the students' world understanding. Early education is most crucial in shaping the perception of the world. The earlier the ocean sciences are implemented, the better. Therefore, in 2014 Gdynia Aquarium organised a course for teachers engaged in the early and primary school education. The program confronted the question: *How to inspire development of children's active interest in the sea?* The curriculum included workshops on the marine organisms and methods of active teaching with emphasis on the marine education. The classes were held in the Gdynia Aquarium exhibition and laboratories, in nearby marina and on the board of the hydrographic cutter. Participants were challenged to prepare their own lessons, where children could actively get familiar with the surrounding aquatic environment. The course highlighted significance of the water reservoirs in vicinity of educational units, that could serve as the perfect classrooms. Some of the resulting lessons were truly inspiring. The poster session on the teachers' field classes was organised afterwards. The indirect receivers of the program were children, who were involved in the lessons and could admire posters presenting their fieldwork, in the Gdynia Aquarium exhibition, among many tourists.

Ocean literacy initiatives at CEFAS

Denise Goldsmith

Centre for Environment, Fisheries & Aquaculture Science, Pakefield Road, Lowestoft, Suffolk, UK NR330HT

For those of us involved in and passionate about the marine environment it is not difficult to understand the absolute necessity for stewardship of the marine environment. There is an urgency and importance of Ocean Literacy as part of the school curriculum to educate and inform of the role that the oceans play in maintaining a healthy planet. There is a need to empower whole communities to realise the part that they play in keeping the marine environment clean and healthy and in turn keeping themselves healthy.

Many organisations are already providing some marine education for schools and non-school groups, networking and providing resources. However, for many organisations delivery of Ocean Literacy is dictated by available funding and time. Events such as EMSEA provide us with an opportunity to share ideas and resources and inspiration. For those without this existing passion and knowledge we need a helpful, user friendly collaborative approach to finding, delivering and utilising available resources. Only through collaborating with a whole range of community organisations such as research institutes, local councils, schools, NGO's, local businesses etc will we be able to pool strengths and deliver initiatives on a greater more targeted scale. This is how Cefas is attempting to do just that

An overview of the current ocean education landscape in Canada

Sonya Lee

Canadian Network for Ocean Education (CaNOE)

The ocean is important to Canadians culturally, environmentally, and economically—yet low levels of ocean literacy have been identified in Canada. Though current ocean education initiatives in Canada are doing excellent work, they are predominantly uncoordinated and insular, leaving a need for a unifying body. The Canadian Network for Ocean Education (CaNOE) is an organization that aims to provide a platform for dialogue, sharing, and learning among marine educators and scientists while supporting Canada's international responsibilities in advancing ocean literacy. Since its inception in 2014, CaNOE has become a non-for-profit organization, increased presence at national and international conferences, and has been part of outreach and community events across Canada. CaNOE has also hosted two *Ocean Literacy in Canada Conferences* on both the west and east coasts. These efforts over the past couple of years have attracted a membership of over 350 individuals. A poster at EMSEA is an opportunity for CaNOE to provide an overview of the current ocean education landscape in Canada, learn from others who have experience with ocean literacy networks, and engage members of EMSEA to see how we can benefit one another as we work toward a more Transatlantic ocean-literate society.

Bringing and fostering ocean literacy through conservation in context

Ana Pinto

Zoological Society of London

How do zoos such as ZSL (Zoological Society of London) London Zoo engage and inspire their school audiences with marine conservation projects and campaigns? What approaches can zoos take to integrate ocean literacy into their learning programmes?

Inspiring a lifelong interest in, and support for conservation is part of ZSL's Learning Mission. *Conservation in Context* is one of ZSL's five Principles for Excellence that underpin all learning activity at ZSL. The Learning Mission and the Principles of Excellence have shaped how the Discovery and Learning team at ZSL considers the questions above.

The Discovery and Learning Department's involvement with scientific projects provides a unique opportunity to offer inspiring learning experiences. This poster will showcase an interdepartmental collaboration between ZSL's Discovery and Learning and Conservation Programmes teams. The collaboration has provided the opportunity to use a range of different approaches to inspire and engage ZSL's school audiences with current marine conservation projects and campaigns.

This project provided support for scientific staff working to protect marine life in the Pitcairn Islands- a UK Overseas Territory, and a member of the D&L team embarked on two exciting journeys to the remote Pitcairn Islands. The journeys themselves have provided a range of opportunities for contact between ZSL staff and UK schools as well as contact between UK schools visiting ZSL London Zoo and Pulau School in the Pitcairn Islands using ZSL London Zoo's learning activities. Opportunities to engage with audiences also originated from this collaboration via the ZSL website and digital outreach activities.

14:00 Parallel Session 1

A. Bringing Marine Science into formal and informal education settings (student targeted)

Marine science arts interpretation

Joanna Henley
Sciart Solutions, UK

This abstract reports on five years of educational collaboration between Cornwall based Sciart Solutions (a marine educational consultancy) and Surfers Against Sewage (an Environmental Charity). This educational pairing was conceived to design and develop a range of marine science educational experiences and resources using participatory visual arts and inclusive interpretation.

Delivering marine science in both informal and formal education settings, the partnership have developed a series of marine education programmes, engaging a broad ranging public audience in the marine environment and its conservation. Three school outreach and public engagement campaigns are reported on: The 'Think Before You Flush' and the 'Seas for Life' campaigns communicate the themes of marine litter and sustainable fishing, respectively and the most recent 'Be the Change' campaign tackles urban and rural litter and its impact on the oceans. These often challengingly uncharismatic environmental messages have been delivered to the broadest lay audiences, via participatory arts interpretation of marine science.

Success has been achieved via the use of a range of interpretive techniques including: bespoke branded campaign strategies; engaging illustrative and graphic design; and interactive resources (including educational games and print media), in both outdoor and indoor learning environments. Furthermore, the campaigns champion the use of romantic pedagogy, to catalyse awareness raising of marine biodiversity and ecology, to engender more wide scale public participation and trigger positive behaviour change.

Doing science like an ocean scientist: Ocean immersion programs to engage students and teaches outside the classroom – at sea, in labs, in the field

Angela Lodge,
University of South Florida

Sail with us through a series of ocean education programs developed to nurture enthusiasm and engagement in marine sciences. We will share how three outdoor learning programs utilize an ocean science context to teach standards-based concepts to youth and teachers. Programs are aligned with components of the Essential Principles of Ocean Literacy and include embedded assessments.

The Oceanography Camp for Girls provides *teen-aged girls* 3-weeks of inquiry-based, multi-disciplinary, experiences in laboratory and field environments. Activities include a day at sea aboard a research vessel, coastal fieldtrips, laboratory research, and career interviews with scientists. Professional Development opportunities bring the 'ocean to classrooms' and 'teachers to the ocean'. During Gulf of Mexico research cruises, *teachers* join the scientific team to conduct at sea research for long-term monitoring after DWH. During Tampa Bay NOAA-BWET program teachers become GLOBE certified to engage *students* as 'citizen scientists' who collect environmental data to monitor their communities and share results with students and scientists worldwide. Learning is sustained as students and teachers 'sea' science beyond classrooms engaging in doing science within their communities.

Building and fostering ocean literacy through conservation in context

Ana Pinto

Zoological Society of London

How do zoos such as ZSL (Zoological Society of London) London Zoo engage and inspire their school audiences with marine conservation projects and campaigns? What approaches can zoos take to integrate ocean literacy into their learning programmes?

Inspiring a lifelong interest in, and support for conservation is part of ZSL's Learning Mission. *Conservation in Context* is one of ZSL's five Principles for Excellence that underpin all learning activity at ZSL. The Learning Mission and the Principles of Excellence have shaped how the Discovery and Learning team at ZSL considers the questions above.

The Discovery and Learning Department's involvement with scientific projects provides a unique opportunity to offer inspiring learning experiences. This poster will showcase an interdepartmental collaboration between ZSL's Discovery and Learning and Conservation Programmes teams. The collaboration has provided the opportunity to use a range of different approaches to inspire and engage ZSL's school audiences with current marine conservation projects and campaigns.

This project provided support for scientific staff working to protect marine life in the Pitcairn Islands- a UK Overseas Territory, and a member of the D&L team embarked on two exciting journeys to the remote Pitcairn Islands. The journeys themselves have provided a range of opportunities for contact between ZSL staff and UK schools as well as contact between UK schools visiting ZSL London Zoo and Pulau School in the Pitcairn Islands using ZSL London Zoo's learning activities. Opportunities to engage with audiences also originated from this collaboration via the ZSL website and digital outreach activities.

Success in bringing marine science into formal and informal education settings

Emily Readman

Marine Biological Association

Everyone is capable of apprehending Marine Science, it is predominantly a question of how people in the scientific world communicate the information. The Marine Biological Association's Beach Rangers program has been finding innovative ways of engaging the Plymouth community about Marine Science for 5 years. Past activities have included writing marine raps and snorkel safaris. This year, we are on target to reach over 5000 people across Plymouth over the summer period, through our free, informal community outreach events and formal presentations in schools. All of the sessions we deliver are underpinned by the ocean literacy principles of the Sea Change project, coordinated by the MBA. This year, we have developed a new, educational initiative within our outreach events: guest scientists from the MBA are joining the Beach Ranger team on the shore, at the community events. Having worked together closely to develop a presentation and activity suitable for the general public, we deliver sessions about the scientists' cutting edge research. This gives the community the opportunity to learn about research which they may have, otherwise, felt was beyond their grasp. These sessions connect academia and the public, and forge stronger links between the community and the marine environment.

"Mar Interior": an ocean literacy route among schoolchildren from Spanish landlocked regions

Andreu Dalmau, Jordi Sànchez, Manel Gazo

SUBMON

"Mar Interior" is an educational project which main objective is to bring the sea closer to children living far from the coast. Specifically, this project consists in itinerant interactive sessions, which take place in different rural schools, where students (from 6 to 12 years old) learn about our oceans and seas, discover their inhabitants, learn about

their conservation issues and understand how important it is not only to protect the species but the habitats they live in.

Since 2014, this project has been carried out in 10 provinces of Spain (Ávila, Burgos, Cáceres, Cuenca, Lleida, Madrid, Segovia, Teruel, Toledo and Zaragoza), reaching 61 rural schools and a total of 1458 schoolchildren.

The project has always been a success, improving the knowledge of the students and increasing their interest and implication with marine issues. This confirmed education as an essential tool for marine conservation.

B. Bringing Marine Science into formal and informal education settings (non-student targeted)

Holding back the tide: ocean literacy in primary student teachers

Dromgool-Regan, C.¹, Burke, N.², McCloughlin, T.J.J.³

¹*Marine Institute*

²*Galway Atlantaquaria*

³*Dublin City University*

There is an urgency to ensuring that primary school teachers on entering service have an adequate level of ocean / marine literacy. There is the age-old dichotomy of the land (lubber) versus the sea and increasingly young people are not only becoming detached from their landward surroundings - characterised as 'nature deficit disorder' - but the marine environment also which we characterise as 'marine deficit disorder'. In fact, young people have probably become detached from the sea much earlier in historical terms, and the situation regarding the marine is thus all the more perilous. As these young people become teachers, they lack the connection with the sea in order to effectively teach about the marine in their classes. Marine literacy is critical for teachers to allow children to consider the marine as a source of employment in a wide range of industries which otherwise they remain unaware of. Therefore we consider marine literacy to go beyond 'knowledge': it is something that comes about through interpersonal exchange of experience, which in the past relied on (grand)parent-to-child transmission. As this transmission has been interrupted, marine literacy must now be 'taught' or learned in new ways. In order to provide a baseline of student teachers' marine literacy, and to test the efficacy of the Ocean Literacy Questionnaire OLQ, developed by the Marine Institute, a sample of n=35, mean age= 19.8yrs, student teachers at Dublin City University St. Patrick's Campus completed the OLQ prior and following an intervention on marine literacy. The OLQ is a six-question questionnaire which elicits perceptions of how ocean literacy fits into the primary school curriculum, perceived importance of content areas, and perceived barriers to implementing marine education in primary school. The resulting data was analysed using standard statistical methods for non-parametric data which established a positive differential across the implementation of the intervention. The intervention involved a pilot marine module 'Environmental Systems: The Marine Environment' being delivered by Dublin City University St. Patrick's Campus and the Marine Institute's Explorers Education Programme™. It is expected that as a result, the intervention will be broadened to include further marine literacy training of student teachers.

What are the barriers to teaching children about the Ocean? Results from a Consultation in the UK

Susana Lincoln, Paul Buckley and Denise Goldsmith

Centre for Environment, Fisheries and Aquaculture Science (Cefas), Pakefield Road, Lowestoft, Suffolk NR33 0HT, UK.

SeaChange is an EU Horizon 2020 project involving many European partners, which goal is to change the way people view their relationship with the sea. One objective in particular focuses on education and lifelong learning as vehicles for sustainable change. Project partners carried out consultations in their own countries, to gain an insight into barriers and solutions to teaching secondary education pupils about the Ocean.

The UK consultation was hosted by Cefas, a world leader in marine science and technology and one of the SeaChange partners. It consisted of an initial collation of barriers online and a workshop event to refine those barriers and propose options. We invited stakeholders with interests in education as well as the marine environment, and the consultation followed a collective intelligence protocol.

The results of the consultation indicated that the national curriculum syllabus and the stretched budgets within schools were the top barriers. The top voted option proposed by the stakeholders was to launch a high profile campaign to get marine topics on the national curriculum across all subjects. Results from all the in-country consultations will be published and an overall report will identify a way forward to bring Ocean Literacy into schools in Europe.

Ocean literacy from the scratches - polish example

Grażyna Niedożytko, Weronika Podlesińska

National Marine Fisheries Research Institute, Gdynia Aquarium, Kołłątaja 1, 81-332 Gdynia, Poland

EMSEA14 was the first time when employees of the NMFRI Gdynia Aquarium have heard about the idea of ocean literacy. Of course all of us knew that people should be aware of their impact on the ocean and the influence of the ocean on their life's. But meeting enthusiast that organize themselves to have a bigger impact on the audience was eye opening. Working together can foster the impact of your actions is not just words. We understood that joining people involved in the marine topics in our country is required. EMSEA15 reinforced this need. The goal was to organize a network of polish organizations and enthusiasts involved in ocean literacy. The idea was to show what are the ocean literacy concepts, collect examples of good practices of ocean literacy in the country and create a community of people engaged in this field.

This presentation will show what we've learned from the EMSEA family and how a national campaign of ocean literacy was organized with no external funding.

The aim of the presentation is to inspire people who feel the need to act widely but fear of making the first step.

Schools Pilot – Introducing Ocean Science into Mayo Schools

Anne Ruddy

RedRose Developments, Ireland

Ireland has for generations relied on the Atlantic for food, fertiliser and medicines. New technologies and global opportunities have enticed our young people away, and lack of indigenous industry impacting on rural coastal communities. As oceanic pollution disrupts our delicate eco-systems, we feel that it is imperative that marine education becomes a feature for all students to maintain a healthier and more secure livelihood.

Redrose Developments undertook a pilot study delivering marine education to assess the receptivity of students, schools and local communities to marine science. During the academic year 2015/2016 two lesson plans created by the Marine Institute were delivered to 12 schools across County Mayo, each school having three visits. We measured learning outcomes, assessing both National (primary) level and Secondary level (Transition Year), using methodologies from the NCCA (). Coastal and urban schools were assessed to identify differentials in levels of engagement. Age, gender differences and social and economic implications were also considered. Teachers' attitudes, personal knowledge, awareness and levels of enthusiasm were measured during each of the visits. The correlation of student engagement with the foregoing was also reflected upon.

The study will produce a report to highlight challenges of introducing a diverse and varied science into the already crowded curriculum. It will demonstrate findings of differences identified, strengths and weaknesses of working EMSEA 2016 Programme

with different age groups and socio-economic impacts on learning. The data will provide a useful indicator of how students and teachers are likely to accept the new area of investigation and how it could be aligned with existing strands. Although derived from a small study, the findings provide a positive starting point to establishing a robust system to capture metrics and produce strong evidence for learning outcomes in marine science.

Incorporating Authentic Ocean Data into Formal Classroom Instruction: Implications for Student Engagement and Scientific Practice

Meghan Marerro
Mercy College, USA

It is only when students actually engage in scientific practices that they will understand how science advances, that is, how scientists establish and support their findings (Osborne, 2014). By engaging students in analyzing and interpreting authentic ocean data, students develop their own scientific practice. Research has found that when using science practices, such as data analysis, students show deeper conceptual understanding and improved motivation (Minner, Levy, & Century, 2009). Due to improved remote sensing and technological capabilities, there are myriad data sets freely available online. In the ocean sciences, available data sets include sea surface temperature (SST), bathymetry, chlorophyll, pollution, sea ice, salinity, and tracks of animals. Utilizing these and other authentic data sets can make learning experiences more powerful for learners, giving students the opportunity to gain contextual understandings of the applications of science (Chin & Malhotra, 2002; Doering & Veletsianos, 2007; Krumhansl et al., 2013; Lee & Butler, 2003).

This presentation will describe a study conducted with a group of in-service teachers enrolled in an online graduate course, the focus of which was using ocean data to track marine animals including seabirds, sea turtles, marine mammals, and sharks. In the course, the teachers were taken through a series of activities to give them experience in accessing and analyzing authentic ocean data. For instance, they examined SST and ocean current data to compare water movement in the Atlantic and Pacific ocean basins, compared the bathymetry of coastlines, and looked at Arctic animal tracks with respect to sea ice. The teachers engaged in their own research activities, analyzing the movements of specific marine animals with respect to Earth data, and presented their findings, both in writing and orally to the class during a synchronous online session. The ultimate goal was for teachers to implement similar practices in their own classroom.

Through a qualitative case study (Merriam, 1998), built through an analysis and synthesis of diverse data sources, including interviews, student work, and discussion posts, the research sought to understand teachers' perspectives of using ocean data in the classroom, in terms of benefits to students. The case study uncovered important themes in terms of students' engagement in learning as well as ability to construct scientific explanations based on evidence. Given the myriad ocean data sets freely available, and many student-friendly platforms to now access and use those data, this approach represents one way to get students appropriately employing science practices using authentic data and ultimately improving their ocean literacy.

16:30 Workshops

WORKSHOP 1: From fishing to farming: aquaculture

(An open workshop of 90 minutes, co-sponsored by the H2020 Sea Change and AORA-CSA projects)

The main objective of this workshop is to gather educators, scientists and representatives from the aquaculture industry to discuss sustainable aquaculture and understand how this hot topic can be addressed with students and the general public in a balanced way.

Historically humankind has improved the availability of food, adapting wild animals and plants through domestication, that occurred essentially on land. The domestication of seafood requires a higher level of technology and, on the other hand, the ocean was perceived as being capable of producing an unlimited amount of seafood. With the growth of the world population, the world will have to find different and innovative ways to feed its people. Depending exclusively from wild seafood will no longer be possible, as some species are becoming endangered. Aquaculture, the “seafood domestication”, is one of the solutions to the problem, provided it is done in a safe and sustainable way.

Educators will join aquaculture experts from the United States and from the AORA-CSA project (Atlantic Ocean Research Alliance - Coordination and Support Action) to discuss safety and environmental impacts of aquaculture, topics that are relevant for consumers. This workshop brings together leading providers of applied marine science for society and experts to identify issues that are limiting growth of aquaculture, provide insight to trade-offs associated with different development options and address risks of unsustainable pressure on ecosystem goods and services. This workshop will build the capacity to inform educators, students, parents and the general public so that they are able to make responsible aquaculture-based choices.

An experimental kit developed by CIIMAR, Interdisciplinary Centre of Marine and Environmental Research, in Portugal, to allow 3rd cycle and high school students to build a small demonstration prototype of a sustainable aquaculture installation will also be presented. The kit is based on research developed in this scientific institution about Integrated Multitrophic Aquaculture (IMTA). The IMTA is a state-of-the-art technology combining production of species that occupy different levels in aquatic food chains. In this system, waste products (e.g N, CO₂) produced by one species is used as resources for other species. The kit promotes understanding of key aspects of efficiency in resource use and addressing biodiversity and eutrophication problems associated with the discharge of effluent enriched in inorganic nutrients. It also addresses solutions for the sustainable production of marine biomass, aiming at minimizing environmental impact and promoting economic recovery through product diversification.

Tentative agenda:

- Welcome address: Ana Noronha (CIENCIA VIVA / AORA CSA/Sea Change), Wojciech Wawrzynski (ICES / AORA CSA) and Paula Keener (U. S. National Oceanic and Atmospheric Administration (NOAA)/AORA Galway Implementation Committee, Ocean Literacy Working Group Co-Lead; (10 min)
- David Cline (President Elect, U.S. Aquaculture Society): existing marine aquaculture educational programmes; (10 min)
- Dave Bader /(or) Kim Thompson (Seafood for the Future, Aquarium of the Pacific): the role of public aquaria in aquaculture perception; (10 min)
- Laura Guimarães (CIIMAR/Sea Change): integrated multi-trophic aquaculture and public perception (10 min)
- Panel discussion: stakeholder views on aquaculture public perception and aquaculture education; acquiring feedback on what educators need to change public perception;

As a result of this workshop, a report on best practices for the introduction of these topics in Ocean Literacy will be produced by AORAC – CSA (Workpackage OL, with inputs from participants and in collaboration with the AORA Galway Implementation Committee, Ocean Literacy Working Group and the Aquaculture Working Group.

WORKSHOP 2: Open data and opportunities for Ocean research

Luc Zwartjes, *EUROGEO, Geography Department, Ghent University*

As a result of the INSPIRE Directive more and more data is becoming open and available to the public. The challenges as a result of this is:

- How to get access to these datasets
- How to elaborate this data so they add value through visualisations such as graphs, tables, maps.

At the same time the rise of GIS (geographic information systems, today also referred to as geographic information science) has been spectacular, and simple tools make it possible to translate the data into the desired visualization, and to share these through modern communications media thus helping governments, scientists, educators, students and the general public.

This workshop will help the EMSEA-participants in dealing with both issues.

You will get an introduction to open science and open research as well as open data and how to search for it.

After that – using simple tools and online software (all free to use) – you will learn how to process these data into your desired outputs.

Max number of participants: 25

Resource requirement: bring your own device

Abstracts Wednesday, October 5th

09:00 Parallel Session 2

A. EMSEA-Med specific work

Ocean Literacy from the Arctic to the Mediterranean: my experience as a “Teacher at Sea”

Giulia Realdon

UNICAMearth - School of Science and Technology, Geology Division, University of Camerino, via Gentile III da Varano – 62032 Camerino, Italy

“Teacher at Sea” (TaS) is a program born in the USA, then introduced in Europe by EGU-European Geoscience Union. A TaS, takes part in a real research cruise in the ocean with the aim of disseminating information and teaching activities.

In 2014 I was a TaS aboard the Norwegian R.V. G.O.Sars, sailing to the Arctic (West of Spitsbergen) during EuroFleets-2 PREPARED Cruise. PREPARED was an international multi-disciplinary research cruise lead by OGS-Istituto Nazionale di Oceanografia e Geofisica Sperimentale of Trieste (IT). During the cruise 30 researchers and technicians from 9 countries carried out a wide array of investigations in different fields (marine geology, biology, geophysics, oceanography and environmental science) by means of various and sophisticated equipment. As a TaS I worked shifts with the rest of the team (CDT–water sampler deployment); when I was not on duty, I took pictures, interviewed the researchers, wrote a blog (www.tasprepared.blogspot.com) and planned how to bring my experience to schools.

Once home I developed teaching activities (on micro-plastics), gave interviews, presentations and teacher training workshops, wrote articles for teacher journals (<http://www.scienceinschool.org/content/microplastics-small-deadly>). Finally I took my message from the Arctic to the Mediterranean to inform and inspire about Ocean Literacy.

PERSEUS Ambassadors: The voice of the younger generation towards Clean Seas

Streftaris N.¹, Papathanassiou M.¹, Giannoudi L.¹, Ioakeimidis C.¹, Fermeli G.², & Papathanassiou E.¹

¹ *Hellenic Centre for Marine Research, Athens, Greece*

² *Institute of Educational Policy, Athens, Greece*

A new challenge to research projects is their impact on the young generation, the promotion of ocean literacy and the active engagement of society. Attempting to overcome this challenge, the PERSEUS research project selected five students from Mediterranean and the Black Sea countries to act as 'Clean Seas 2020' Ambassadors, representing their schools, countries and the future generation to address the emerging environmental threats studied and highlighted by PERSEUS in their own way.

PERSEUS's international environmental education network 'My School Voyages with PERSEUS', introduced the 'Clean Seas Ambassadors' concept, giving students the opportunity to become ambassadors for their school, through a competition. Ambassadors received regular training from their PERSEUS mentors in order to address the major environmental problems faced by their countries, namely Eutrophication, Non-Indigenous Species, Marine Litter, Fisheries and Jellyfish. They studied, proposed solutions and made recommendations to ensure their right to Clean Seas.

Their message was voiced in a special event at the European Parliament in Brussels (Dec. 2015), chaired by MEP Mr. Ricardo Serrao Santos, organized during the closing Conference of PERSEUS. MEPs, several of the Commission's DG senior officers, high level stakeholders and scientists attended the meeting where the 'Ambassadors' presented their recommendations and delivered their statement which was enthusiastically received by the participants.

Oceans, an international educational project for students aged 12-16. Introducing ocean literacy from the students' experience

Carolina (Carol) Campillo Campbell

S'Agulla, C/ Abat Escarré 28, 2ª, Blanes, Spain, 17300

Oceans is an international educational Project for students aged 12 - 16. It is organised by the Spanish environmental association S'Agulla in collaboration with iEARN Pangea (the Spanish representative of the non-profit international educational association iEARN). The objective is to make students (and teachers) realise that the sea is not the same around the world by discovering the marine environment from the point of view of oceanography, geology and biology. This knowledge is achieved through their own observations and sharing their results with those of other participating schools. Communication will be done using Information and Communication Technologies (ICTs). The aim is to give value to the local knowledge to get an insight about how the Planet works globally, being a first approach to some of the concepts of ocean literacy. Especial emphasis is done to make it an emotional experience through a series of cross-disciplinary activities. S'Agulla considers that the best way to awaken environmental awareness is by making the first approach to the marine environment a touching experience.

The Mediterranean Sea Literacy: a collaborative and innovative effort to promote sustainable development in the region

Santoro F.¹, Mokos M.², Cheimonopoulou M.³, Koulouri Y.⁴, Ioakeimidis C.⁴, Papathanassiou M.⁴, Realdon G.⁵, Boubonari T.⁶, Mogias A.⁶, Kevrekidis, T.⁶, Previati M.⁷, Gazo M.⁸, Satta A.⁹

¹*Intergovernmental Oceanographic Commission of UNESCO*

²*University of Zadar, Croatia*

³*Hydrobiological Station of Pella, Directorate of Decentralized Agencies of Macedonia -Thrace, Ministry of Rural Development and Food, Edessa, Greece*

⁴*Hellenic Centre for Marine Research, Greece*

⁵*University of Camerino, Italy*

⁶*Democritus University of Thrace, Greece*

⁷*Underwater Bio-Cartography (U.BI.CA s.r.l.), Italy*

⁸*SUBMON, Spain*

⁹*Mediterranean Sea and Coast Foundation, Italy*

Building on the EMSEA experience, a group of researchers and educators from the Mediterranean Region, EMSEA-MED, started a collaborative and innovative effort to promote the ocean literacy principles in the region, and to adapt them to the specificities of the *Mare Nostrum*.

The Mediterranean Sea is not only considered the cradle of civilization, but it has also great environmental, social and economic importance. With this work we aim at making the Mediterranean citizens, as well as all those having a stake in it, more aware of its potential and role for sustainable blue economy. The Mediterranean Sea is also changing fast in response to both natural and anthropogenic pressures. Climate change, growing maritime traffic and marine litter pollution, overexploitation of fish stocks and invasions of alien species are among the main threats placing the Mediterranean region at risk. At the same time, the Mediterranean's unique features, such as the exceptional Mediterranean biodiversity and the unique and mild Mediterranean climate positively influence human activities such as agriculture, mariculture, and tourism.

This presentation will focus on the EMSEA MED group method of work, and on the first draft Mediterranean Sea Literacy principles and concepts. The main objective is to have a first peer-review of what has been done so far, and to gather support from other colleagues willing to join this effort.

B. OL Principle 6: Oceans and Human health – What will be our legacy?

Measuring ocean literacy: What teens understand about the ocean using the survey of ocean literacy and engagement (SOLE)

Teresa Greely and Angela Lodge

University of South Florida College of Marine Science, St. Petersburg, FL 33701 USA

The present study analyzed underlying factors and patterns contributing to ocean literacy and reasoning within the context of an ocean education program, the Oceanography Camp for Girls. The OCG is designed to advance ocean conceptual understanding and decision making by engagement in a series of experiential learning and stewardship activities from authentic research settings in the field and lab. The research measured a) what understanding teens currently hold about the ocean (content), b) how teens feel toward the ocean environment (environmental attitudes and morality), and c) how understanding and feelings are organized when reasoning about ocean socio-scientific issues (e.g. climate change, over fishing, energy). Findings provide empirical evidence that connects field studies with ocean literacy. Current guidelines for ocean literacy address cognitive understanding but lack multimodality. The need for ocean literacy that goes beyond content to include reasoning and actions is relevant towards preparing students, teachers and citizens to regularly contribute to decisions about ocean issues and pursue actions as consumer, citizen or steward. This research supports the use of socio-scientific issues and stewardship to advance 'functional' ocean literacy.

Global Ocean Science Education: Results from the Second International Workshop

Gail Scowcroft¹, Peter Tuddenham², Francesca Santoro³

¹*Inner Space Center, University of Rhode Island, USA*

²*College of Exploration, USA*

³*Intergovernmental Oceanographic Commission*

Building on the first Global Ocean Science Education Workshop, the second workshop (held June 13-15, 2016 at UNESCO Headquarters in Paris) provided an exciting opportunity for ocean scientists, education professionals, policymakers, and business leaders to explore ocean science education issues. The participants from 17 nations addressed ocean science education priorities related to global concerns, including the ocean and human health, enhancing ocean science education to support the 21st century workforce, and the importance of informal ocean science education on policy.

Special presentation topics included the role of ocean science education in the context of international ocean governance and how the science, education, business, and policy sectors can effectively work together to support the blue economy. This presentation will focus on workshop outcomes, including recommendations for future education activities related to the ocean human health, increasing cross-nation collaborations to grow the blue economy, and activities for building a global ocean science education network. A summary of the 2016 workshop report will also be provided.

Sea Change – Resources for Marine Educators

Fiona Crouch

Marine Biological Association, UK

Sea Change is a €3.5 million EU Horizon 2020-funded project that addresses the challenge of raising European citizens' awareness of the intrinsic links between the ocean and human health.

Europe cannot achieve sustainable exploitation of marine resources and maintain a healthy ocean unless its citizens understand the full extent of the medical, economic, social, political and environmental importance of the sea to

Europe and how their behaviour can have an impact on marine ecosystems. By developing “Ocean Literacy” (an understanding of the ocean’s influence on us and our influence on the ocean) in Europe, Sea Change aims to foster responsible behaviour of citizens towards the seas and ocean and their resources.

Sea Change began in March 2015 and involves 17 partners from nine countries across Europe. We are now half way through the project and have accomplished a great deal from reviews of marine formal education, developing an online directory of marine best practice, education consultations in 8 European countries and produced a number of animations. During this presentation I would like to share with you the resources we have developed to date and what we have planned for the second phase of the project.

10:00 Flash Poster Presentations 2

Digital Collecting: Use That Smartphone For More Than Texting!

Antonios Pappantoniou
Houstatonic Community College

The digitization of natural history collections has become a priority for many museums. Major natural history museums are investing time and funds to create digital images of their holdings. For many years students taking my marine science class were required to make a labeled collection of local marine life. These collections were often cumbersome to make and bring to class. Physical collections are now unnecessary with almost universal access to smartphones with high-resolution cameras. Students can make digital collections by photographing the specimens. Our collecting site is a local public beach. Students are given a checklist that contains the common and scientific names of local marine organisms and field guides to help with identification. The assessment for this exercise is a PowerPoint presentation that students submit. Each slide contains an image of the organism they photographed, basic locality information, a classification of the organism from kingdom to species and three “interesting facts” about the organism. Students are given a model slide they can use as a template for making their own PowerPoint slides. The model slide lends uniformity to the project and assures that all students put in the same effort in creating their digital collection.

Digesting MSFD and GES to be easily incorporated to primary and secondary syllabus

Jordi Sanchez, Andreu Dalmau and Manel Gazo
SUBMON – Conservation, Study and Awareness of the Marine Environment, Rabassa 49-51 08024 Barcelona

With the aim to protect more effectively the marine environment across Europe the European Commission established a framework for action in the field of marine environmental policy creating the Marine Strategy Framework Directive (MSFD). This Directive was adopted in June 2008, and it was due to be transposed into national legal system by 2010. The main aim of MSFD is to achieve Good Environmental Status (GES) of the EU’s waters by 2020.

With the aim to aware civil society, especially students, of the implementation of Marine Strategies in Spain, an educational project has been developed to introduce Marine Strategies within the education system through educational materials to promote awareness in future generations, and make the environmental policies applied by the country towards their coasts and seas more understandable. The project has adapted and developed six dossiers for students from elementary through high school explaining what MSFD is, which are and why the eleven descriptors are used and finally what has to be done to achieve the foreseen GES in Spanish waters. At each level, exercises and activities have been elaborated to implement this knowledge and evaluate the student skills both in Marine Strategies and Ocean Literacy. A teacher dossier for each level has also been created with additional material, examples and case studies. All the resources are available at www.estrategiasmarinas.info and also an

image database with pictures of the most relevant marine species of Spanish coasts can be downloaded for educational purposes. The project has the support of the Biodiversity Foundation, from the Ministry of Agriculture, Food and Environment.

Ocean action art & science approaches to raise awareness about plastic marine debris

José Teixeira, Ágatha Gil, Patrícia Neto

CIIMAR | Interdisciplinary Centre of Marine and Environmental Research of University of Porto, Terminal de Cruzeiros do Porto de Leixões, Avenida General Norton de Matos, S/N, 4450-208 Matosinhos, PORTUGAL

More than 8 million tons of plastic reach annually the ocean, transported from land by rivers, sewers, by air or deposited on beaches. The plastic can last for hundreds of years in the ocean, just breaking into successively smaller pieces. This huge amount of plastic is causing very significant negative impacts on marine life, economic activities and human health (accumulation of contaminants in marine food).

It is estimated that about 2 million marine animals (birds, fish, turtles, cetaceans) die every year due to the intake and entangling in this trash. Sea turtles, for example, easily mistake plastic bags floating with its main food – jellyfish. Any plastic intake can lead to death due to digestive obstruction or suffocation. The impacts of this waste also include bioaccumulation of contaminants in animals due to microplastics ingestion, destruction of habitats and transport of invasive species.

Ocean Action Campaign invested in different communication tools to address and raise awareness of school community and general public about the problem of marine debris, particularly plastic waste in the ocean.

The exhibition "A Plastic Ocean", spread three large sculptures constructed in partnership with ESAP (Artistic School of Oporto) with plastic discarded throughout different public spaces of the Porto city. The sculptures, depict different consequences of plastic debris on marine life and human health. An itinerant exhibition focus on using strong visual and sensory objects to attract the attention of visitors, alternating panels with essentially graphic information (infographics and illustration) with art objects and multimedia elements. An original theatre piece "Pearl in Plastic Sea" was also developed by ESAP to explore the marine litter problem and its consequences for biodiversity and the marine ecosystem by recreating the story of the little mermaid, an adventure fraught with danger due to the ever increasing garbage that reaches the sea.

The Campaign Ocean Action, financed by the EEA Grants, also includes more conventional hands on science activities and lectures in schools, beach cleaning activities, a student's contest and the production of educational videos.

All different communication methods aimed to encourage the critical reflection about this environmental problem of great importance and scientific complexity and the need to adopt environmentally responsible behavior by the population through the use of complementary, artistic and innovative approaches.

What do we need to know to act to improve the state of the oceans: example of the ResponSEable human-ocean knowledge system.

Owen Molloy

University of Galway, Ireland

Existing knowledge on marine environment (data and information) is very much focused on marine science and education. The link between who has the knowledge and who is responsible, and must change behavior, is usually missing. It is still rare that produced knowledge focuses on the activities of everyday consumers, users of agriculture products, energy users who rely on energy including from marine-based renewable; users of drinking water and sewage services. Overall, knowledge on how to "do better" and what is in the hands of people for reducing pressures on marine ecosystems is rarely central to knowledge presented, often limited to best practices for the sectors described. To support changes in behavior, it is not enough to have just the knowledge about the state of environment. We also need knowledge about the complexity of connections and linkages between different drivers and pressures that cause degradation in the state of ecosystem goods and services, and most importantly, EMSEA 2016 Programme

connection with impact and response. Poster will present construction of Knowledge base which captures these causal relationships.

Using information technology to enhance rocky shore fieldwork

Ward M.¹, Collard A.², Weston E.³

¹*Field Studies Council, Head Office, Shrewsbury, England, UK*

²*Dale Fort Field Centre, Field Studies Council, Pembrokeshire, Wales, UK*

³*Orielton Field Centre, Field Studies Council, Pembrokeshire, Wales, UK*

This poster will describe a fieldwork-based workshop which explores some of the challenges and benefits of using mobile and web technologies for enhancing student learning for students carrying out fieldwork investigations on rocky shores.

Shoreline environments typically have little or no Internet connectivity, and so a battery-powered WiFi network router and a web-server application running on a laptop computer is used to provide local connectivity between mobile devices. A content management system then authors an activity-specific website, which provides web forms for data recording, and automatically collates group data into summary tables, charts and graphs. The resulting 'field-network system' provides immediate and frequent feedback to students and enables school groups to begin analysing, interpreting and discussing their findings at the shore.

The impact on the learning experience is that: less time is spent on off-task activities (i.e. data transcribing and processing); student progress can be more easily monitored by the tutor, in order to correct mistakes or misconceptions as they arise; and the students can be prompted to review their findings while they are collecting their data in order to actively develop their understanding.

In this workshop participants will have the opportunity to use and critique a field network system and mobile devices on a local rocky shore to collect sample data to: i) study patterns of distribution and abundance of rocky shore organisms and ii) to collate data to construct simple food webs and Eltonian pyramids of numbers and biomass for selected organisms from different trophic levels.

Evaluating the success of Marine Science Camps: improving the provision of marine science education opportunities in post -16 students.

Collard A.¹, Ward M.²

¹*Field Studies Council Pembrokeshire, Dale Fort, Wales, UK*

²*Field Studies Council Head Office, Preston Montford, England, UK*

Since 2014 Dale Fort Field Centre (Field Studies Council) has been successfully delivering an annual Marine Science Camp, a residential field course aimed at post-16 students with an interest in marine science as a career. There is an extremely limited opportunity for post-16 students in the UK to develop practical experience of marine science unless attending a trip organised by a school, college or university. Students with a passion for marine natural history often feel isolated and unable to pursue their interests with other like-minded peers. The course gives them the opportunity to develop their skills in marine science independently with other students with similar aspirations.

The poster will detail how the courses have been planned, delivered and evaluated with specific reference to:

- how course activities inspire and educate attendees about marine science and potential career opportunities.
- how the course helps bridge the gap between post-16 and university level teaching
- how partnership working enhances course provision

It will be suggested that this Science Camp model could be used at other field studies centres or educational establishments across Europe to improve the provision of post-16 marine education opportunities.

Perception of drug pollution of the aquatic environment among European medical professionals

Kate Shilliday¹ & Dr Anuschka Miller²

¹*University of the Highlands and Islands, Scotland*

²*Scottish Association for Marine Science*

This current BSc dissertation project will investigate the knowledge and perceptions of European medical professionals regarding aquatic drug pollution, with a focus on hormone containing drugs.

This project was inspired following preliminary work which indicated considerable public awareness and concern regarding water pollution by litter, oil, radioactive material and sewage but much lower awareness of drug pollution. It is possible that a lack of discussion between patients and their healthcare providers during the provision of drugs may contribute to this situation. As healthcare systems vary between European countries, the information provided to and guidelines followed by healthcare workers may affect their communication of pollution related issues with patients. The project also considers the printed information provided with every prescription drug.

The research uses a range of methods, including online surveys of healthcare practitioners, focus groups, and desk based research regarding labelling requirements and practices.

The poster will introduce the planned research to a) stimulate discussion about the validity of the approach and b) develop a network of support for improved access to healthcare networks in different European countries.

Abstracts Thursday, October 6th

09:00 Parallel Session 3

A. Blue Growth in Industry

Bridging the gap between ocean literacy and good ocean governance: the Community of Arran case study

Manuela de los Rios

Community of Arran Seabed Trust (COAST), Lamlash, Isle of Arran, Scotland

You do not have a story until something goes wrong. On the Isle of Arran, the dramatic fall of commercial fishing in the 80's and 90's, due to overfishing, destructive fishing methods and poor management decisions, sparked action from two local divers, the founders of COAST.

But they struggled to get the State to address this issue. They realised that their only chance to influence change would be by involving the broader community of Arran, developing a sense of ownership of the marine environment.

For 20 years, a strong common cause has been built through a bottom up approach to community learning and marine citizenship. This "learning by doing" experience succeeded in the implementation of the first community-led No Take Zone in Scotland in 2008 and the South Arran Marine Protected Area in 2016.

Community marine education, outreach and communications have allowed COAST to get "our seas" on the local and national agenda whilst growing volunteer motivation and skills for empowerment (ie: media and political savvy, building scientific evidence, etc.).

Key lessons learnt by the community, as well as challenges and opportunities for an ocean literate island will be discussed in this presentation.

World Oceans Day – new interactive portal

Francesca Santoro

UNESCO

"Bridges Between School and Blue Science" as told by a high school student

Geraldes, D.¹, Mata, B.¹, Silva, F.¹, Sebastião, L.², Pablo, H.³, Costa R.¹, Julião, L.

1 – *Task Group for the Extension of the Continental Shelf (EMEPC) – Portugal*

2- *Institute for Systems and Robotics, Instituto Superior Técnico*

3- *Marine, Environmental and Technology Center, Instituto Superior Técnico*

The Task Group for the Extension of the Continental Shelf (EMEPC) has created an educational project called "Bridges Between School and Blue Science" to promote scientific and ocean literacy and to raise youngsters' awareness for the importance of ocean knowledge in Portugal.

In 2016 it was implemented in eleven high school classes and all its hands-on and minds-on activities were designed according to the national curriculum, promoting ocean-literate students that understand ocean science, can communicate about the ocean and are able to make informed decisions regarding ocean policy.

In this communication one of the students is going to present his experience in the project. He took part in the development of a low cost surface drifter with other colleagues, working alongside scientists of two technological centers: *Institute for Systems and Robotics* and *Marine, Environmental and Technology Center* from Instituto Superior Técnico. These students were engaged in the entire process, designed the drifter, chose the best materials, deployed the drifter in the Atlantic, followed the drifter trajectory in the NOAA database and applied a hydrodynamic model to study surface currents.

With this engagement, students learned concepts of oceanography, improved their communication skills and recognized the relationship between science, technology and society.

Contributing to Blue Growth in Industry

Rosemary McCloskey
Loughs Agency, 22 Victoria Road, Derry~Londonderry, UK, BT47 2AB

One of Lough's Agency's Key objectives is the promotion and development of the Foyle area and Carlingford Lough. In order to achieve these objectives we carry out key activities which build on the Foyle and Carlingford regions strengths, their angling potential, distinctive wildlife and marine/freshwater environment, the range of marine tourism activities on offer to visitors, and the unique marine culture, heritage, events and festivals. One of the ways we do this is by engaging with local maritime providers to support in the creation of authentic marine, lough and river experiences e.g. events and festivals, blue ways, trails, themed activity packs. We also look to provide unique marine and lough experiences to young people through schools and youth programmes, including water-sports taster sessions, river safaris, educational visits and headline youth programmes e.g. Foyle Ambassadors. We aim to provide young people with real skills for the maritime sector, including watersports qualifications, conservation awards and volunteering opportunities which encourage young people into coastal and maritime tourism sectors. This presentation will discuss how an integrated approach of promotion, capacity building and training/education has helped create sustainable coastal and maritime tourism enterprises and initiatives within our catchments that contribute to Blue Growth in industry.

MarineTraining.eu: The one-stop-shop for marine education and training

Thibaud Mascart, Tim tkint, Marleen Roelofs, Ann Vanreusel, [Tim Deprez](#)
Marine Biology, Ghent University, Krijgslaan 281/S8, 9000 Gent, Belgium

Are you having problems finding the adequate marine/maritime course?

Do you have a marine training initiative you want to disseminate at a European scale?

Do you want to outsource the time consuming administrative burden of establishing a training?

The Marine Training Platform is the partner you were looking for!

Our services include insights into a comprehensive database focused on higher education institutes (both universities and university colleges) and a free access to the collected data from all existing European "blue" training initiatives for each country, ranging from master and doctoral programmes, to expert trainings and specialist courses. In addition, our services include organizational aspects of creating and running a training in a straightforward and fast way. We support advertising possibilities, supply administrative services to trainees and training organizers (application, registration & certification) and create marine and maritime dedicated e-learning initiatives.

Moreover, in the framework of the Belgian node of EMBRC (European Marine Biological Resource Centre - a distributed Research Infrastructure (RI), we are gradually expanding, including non-accredited training initiatives (for instance, research institutes and industries).

The Marine Training Platform is your online one-stop-shop for marine/maritime training in Europe:

www.marinetraining.eu

The AlgalFit Project

Rita Rocha

AlgalFit

AlgalFit project aims to assess the fungicidal effect of seaweed extracts of the Portuguese coast to control the fungus *Phytophthora cinnamomi*, also known as ink-disease. *P. cinnamomi* is responsible for much of the decline of chestnut (*Castanea sativa*) in Europe and other forest species such as the cork oak (*Quercus suber*). Both species have a high impact on the national economy. Six marine microalgae species were selected for the study: *Grateloupia turuturu*, *Gracilaria vermiculophylla*, *Sargassum muticum*, *Chondrus crispus*, *Corallina sp.*, and *Codium sp.* The selection criteria was based on the presence of potentially inhibitory biopolymers that might inhibit fungal growth and by its role on ecosystems, as the majority of the selected macroalgae are exotic and even invasive in Portuguese coastal area. Several extraction methods were tested as also several incorporation and inoculation techniques. Mycelium growth diameter was measured during nine days in each experimental tests. *G. turuturu* extract showed the most inhibitory effect over *P.cinnamomi* (63%) followed by *Corallina sp.* (54%). The other extracts did not show significant reductions on fungal growth. By contrary, *S. muticum* extract stimulated the growth of *P. cinnamomi*. The results obtained so far reveal some clues to a commercially viable solution to ink-disease treatment.

B. TransAtlantic work

Inquiry to Student Environmental Action

Géraldine Fauville

University of Gothenburg, Sweden

Inquiry to Student Environmental Action (I2SEA, transatlantic collaboration between the University of Gothenburg and Stanford University), promotes international collaboration among secondary school students by offering free, computer-based learning resources relating to ocean acidification (OA).

With our two virtual laboratories (Our Acidifying Ocean and Virtual Marine Scientist) students learn about the causes and consequences of OA. The students design and run experiments to test the impact of a decrease in pH on the development of marine larvae.

An interactive talk presenting the global consequences of OA allows students to communicate asynchronously with marine researchers and to engage in meaningful discussion.

Students can finally reflect on their own implication in this environmental problem by exploring our carbon footprint calculator focusing on behaviors that students can control.

After students measure their individual carbon footprint, they join several online discussions, thinking through their emissions with their peers around the world, and envisioning personal and societal solutions to decrease them.

Our brand new resource is Dynamic graph visualizations of student footprints and their individual components. Teachers and students will be able to manipulate the data in order to investigate the different emissions of students around the world.

Communicating Ocean Science for Informal Education course launched in Europe

Strang C.¹, & Fauville G.²

¹*The Lawrence Hall of Science, University of California Berkeley, CA, USA*

²*University of Gothenburg, Sweden*

Communicating Ocean Sciences to Informal Audiences (COSIA) is a university course that was created at the Lawrence Hall of Science (LHS), the public science center of the University of California at Berkeley. LHS evaluated, improved and documented the course, and now it is being taught at 25 universities throughout the United States. The course engages the future ocean scientists in learning to communicate their knowledge with the general public in informal environments (e.g. science centers, public aquariums). The course – taught by university ocean scientists in collaboration with educators in science centers and aquariums – introduces students to inquiry-based learning pedagogy and quickly places them in a teaching practicum experience in an informal science education institution. The goal of COSIA is to create a generation of ocean scientists who begin their careers understanding the critical importance of engaging in education and public outreach.

After a success story in the US, the COSIA model is expanding to Europe. The University of Gothenburg was a pioneer by hosting a COSIA workshop to train the future Swedish COSIA instructors. Several other collaborations are also under discussion.

During the session, we will share: details about COSIA, the workshop in Sweden and it's future implementation, and discussion for further European implementations.

Tide to Technology: a science centre working with marine industry to advance ocean and career literacy in Nova Scotia, Canada

Sonya Lee

Canadian Network for Ocean Education (CaNOE)

The Discovery Centre, the Maritime region of Canada's largest hands-on science centre, is working to advance ocean literacy and ocean career literacy by partnering with marine industries in Nova Scotia. The Discovery Centre has developed a program called, *Tide to Technology*, a station-based program that increases knowledge about the wide range of ocean-related disciplines in Nova Scotia. We introduce Grade 8-12 students to ocean technology careers and increase awareness about the vast types of careers in oceans outside the scope of marine biology and oceanography. We work with industry partners and the program is funded by the Ocean Technology Council of Nova Scotia to provide the program for free to students in Nova Scotia.

The program consists of four stations that introduce students to ocean literacy principles, ROVs, and marine acoustics. One of the most important aspects of the program is incorporating the use of hands-on technology as much as possible into these stations.

The Discovery Centre would like to share the successes and challenges of the current version of the program but also introduce the program's new changes that are being implemented this summer to gain some feedback and suggestions about the program to bring back to Nova Scotia.

The Day Christmas Came to Copenhagen International School

Vogt, B.¹, Knappe, C.¹, Payne, D.L.², Grigorov, I.³

¹Copenhagen International School, Denmark

²Connecticut Sea Grant, University of Connecticut, USA

³Technical University of Denmark – Institute for Aquatic Resources

“Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it’s the only thing that ever has.” - Margaret Mead

Research indicates that personal interest, enthusiasm and experience contribute to choices students make regarding future educational and career options (Ormerod & Duckworth, 1975; Renninger, 2000; Renninger, 2003; Tai et al., 2006). As educators we strive to inspire students, knowing that each one we effect will affect many others. Educators will best reach students when they are inspired and understand the science they are expected to teach. A meeting involving teachers at the Copenhagen International School (CIS), DTU Aqua and a visiting Fulbright scholar resulted in a partnership to bring marine science and research into the classroom. The ideas developed during the discussion led to changes in CIS curriculum, enthusing students and teachers alike with the energy of the collaboration. The resulting outcomes have impacted the design of the new CIS school construction. This session will explore the progress of the collaboration, plans for professional development for both teachers and scientists, and address ways scientists and educators can make similar connections and build a Christmas-morning level of excitement and inspiration that can change the world.

References

- Renninger, K.A. (2000). Individual interest and its implications for understanding intrinsic motivation. In C. Sandstone & J.M Harackiewicz (Eds.) *Intrinsic Motivation: Controversies and New Directions* (pp. 373-404). San Diego: Academic Press.
- Renninger, K.A. (2003). Effort and Interest. In J. Guthrie (Ed.), *The Encyclopedia of Education* (2nd ed., pp. 704-707). New York: Macmillan.
- Tai, R.H., Liu, C.Q., Maltese, A.V., & Fan, X. (2006). Planning early for careers in science. *Science*, 312(5,777). 1,143-1,144.
- Ormerod, M.B., & Duckworth, D. (1975). *Pupils’ Attitudes to Science*. Atlantic Highlands, NJ: Humanities Press.

Development of an International Open Source Instrument to Measure Ocean Literacy

Fauville G¹, Strang C.² & Mac Cannady²

¹University of Gothenburg, Sweden

²Lawrence Hall of Science, University of California Berkeley, CA, USA

At EMSEA15 attendees discussed the need to measure progress in the development of Ocean Literacy in our respective countries and regions. We agreed to work together as a community to develop a common, widely accepted instrument to measure Ocean Literacy. The Lawrence Hall of Science at the University of California, Berkeley and EMSEA took the lead on this unfunded, grassroots international project by contributing survey items and gathering others from marine educators throughout Europe and the U.S. We edited and assembled the items into a comprehensive survey of Ocean Literacy.

The draft survey included 50 items measuring ocean knowledge and 15 items measuring marine environmental attitude. It was tested twice and improved in summer 2016. EMSEA arranged for partners throughout Europe to translate the survey into 13 languages. In September, the survey will be launched throughout Europe. Hopefully it will become an international tool used for program evaluation; research on learning; and tracking the local, regional, and global impact of the Ocean Literacy Campaign.

During the session, we will share: our progress to date, some of the challenges we have encountered, and some potential future uses of the instrument. We will also invite input and additional collaborators into this endeavor.

EMSEA 2016 Programme

11:30 Workshops

WORKSHOP 4: Adapting Whales to Teach Food Chains – A pilot program connecting formal and informal education.

Robert Rocha

New Bedford Whaling Museum, Massachusetts, USA and President of NMEA 2015-2016.

In January of this year, the New Bedford Whaling Museum brought a pilot marine science program to the DeValles Elementary School in the City of New Bedford, Massachusetts, USA. This program, written for the fourth grade (ages 9 – 10), was designed to meet a district need in the teaching of the life science topics of adaptations and food chains. The hook for the students was the use of cetaceans (whales, dolphins and porpoises) as the vehicle for the content.

This program, written by the workshop presenter, in partnership with a consulting science teacher (also an NMEA member), consisted of two lessons taught in the school by Museum staff, two program visits by the students to the Museum, and four lessons taught in the school by the classroom teachers. Prior to the initiation of this project, Museum staff and the consulting teacher met with the school's principal and the classroom teachers to discuss structure, content and schedule.

The City is currently in the process of writing its science curriculum and has welcomed our offer to help at this grade level. As with many school districts across the United States, the curriculum emphasis has been on Language Arts and Mathematics. Other disciplines, including science, are secondary. Thus, informal education settings like museums, zoos and aquaria become essential partners to fill in the gaps in content and resources.

This workshop will review the pilot curriculum, dip into some of the learning activities, share some of the teacher and student feedback, and highlight a couple of capstone projects created by the students. We will also discuss the upcoming expansion of this project during the 2016-2017 academic year into six New Bedford schools, and the professional development workshop held in August 2016 to introduce the program to the 4th grade teachers at these newly involved schools.

Maximum Number of Participants: 25-30

WORKSHOP 5: What the VAK (visual, auditory, kinesthetic) with marine science? – a multisensory approach to marine education.

Dominika Wojcieszek, Katarzyna Borowiak, Joanna Chęcińska, Michalina Pączkowska

National Marine Fisheries Research Institute, Gdynia Aquarium Education Center, Kołłątaja 1, 81-332 Gdynia

Teaching large groups of students has always been difficult, especially when the complexity of a learning process and different modes of learning are taken into account. Additional difficulties arise when an educator does not have much time to establish rapport with the audience or, in case of young children (3-6 years), to develop a bond that facilitates communication and therefore learning. As a result, making informal marine education effective and meaningful is a challenge.

Although, VAK (visual, auditory, kinesthetic) modes of learning approach is widely discussed or even controversial, it still provides us with a broad set of tools that help marine educators at the Gdynia Aquarium reach and educate large groups of visitors. The proposed workshop was designed to help educators engage all senses in the teaching-learning process and help them effectively pass their knowledge to diverse audiences. With examples and exercises developed based on our own experience ranging from working with school students of various backgrounds, through

fostering integration of local ethnic groups to handicapped students education we present our VAK approach in informal marine education.

Workshop outline:

1. Assessing participants learning style (VAK test)
2. I see sea – practicing effective visual presentations of marine concepts
3. I hear sea – good practices in talking to people
4. I become sea – using your body in teaching marine science
5. Summary and final mini-project

The participants will be required to present a mini-project that will include a 2-3 minute presentation of a chosen topic. Therefore, bringing own computers or mobile devices is advised.

Maximum Number of Participants: 20

List participants

Dr	Araujo	Faibio	Universidade do Estado do Rio de Janeiro	BR
Mr	Baldwin	Richard	Educational Passages	US
Mrs	Batista	Vanessa	CIENCIA VIVA ANCCT	PO
Dr	Borit	Melania	University of Tromsø, - The Arctic University of Norway	NO
Ms	Borowiak	Katarzyna	National Marine Fisheries Research Institute	PL
Dr	Burke	Noirin	Galway Atlantaquaria	IE
Ms	Calis	Tanja	AquaTT	IE
Ms	Campillo Campbell	Carol	S'Agulla	ES
Mr	Cannady	Matthew	Lawrence Hall of Science University of California, Berkeley	US
Mr	Cash	Jonathan	SERC	UK
Dr	Chandran	Bennett	South Eastern Regional College	UK
Dr	Cline	David	Auburn University - Alabama Cooperative Extension System	US
Ms	Collard	Amy	Field Studies Council	UK
Mr	Conesa Alcolea	Ivan	European Commission	BE
Mrs	Copejans	Evy	VLIZ Flanders Marine Institute	BE
Dr	Costa	Raquel	EMEPC	PO
Miss	Crockard	Debbie	Marine Conservation Society	UK
Miss	Crouch	Fiona	Marine Biological Association	UK
Miss	Cunha	Sara	Colégio Luso-Francês High School	PO
Mr	Dalmau	Andreu	SUBMON	ES
Miss	De los Rios	Manuela	COAST - Community of Arran Seabed Trust	UK
Dr	De Pablo	Hilda	EMEPC	PO
Dr	Deprez	Tim	Ghent University - Marine Training Portal	BE
Ms	Dromgool-Regan	Cushla	Marine Institute	IE
Mr	Duane	George	Massachusetts Marine Educators	US
Ms	Fauville	Geraldine	University of Gothenburg	SE
Mr	Fawzy	Tamer	Baltic Environmental Forum Germany	DE
Miss	Figuerola	Laura	SUBMON	ES
Mr	Gazo	Manel	SUBMON	ES
Miss	Goldsmith	Denise	Cefas	UK
Dr	Greely	Teresa	USF College of Marine Science	US
Miss	Griffiths	Jenny	Marine Conservation Society	UK
Dr	Guimaraes	Laura	CIIMAR, University of Porto	PO
Ms	Heaney	Susan	Blue Inspiration	UK
Dr	Henley	Joanna	Falmouth University	UK
Dr	Holland	Rob	Oil Spill Response Ltd	UK
Mr	Holmes	Michael	SERC	UK
Miss	Hunt	Lucy	Sea Synergy Marine Awareness Centre	IE
Miss	Hunter	Rebecca	NI Marine Task Force	UK
Mr	James	Tom	Living Coasts	UK

Dr	Joyce	John	AquaTT	IE
Miss	Julião	Luna	EMEPC	PO
Ms	Keener	Paula	NOAA	US
Ms	Lee	Sonya	Discovery Centre/ Canadian Network for Ocean Education	CA
Dr	Lodge	Angela	USF College of Marine Science	US
Dr	Marrero	Meghan	Mercy College	US
Miss	McCloskey	Rosemary	Loughs Agency	UK
Dr	Miller	Anuschka	Scottish Association for Marine Science	UK
Dr	Molloy	Owen	NUIG	IE
Mr	Murphy	David	AquaTT	IE
Dr	Nedreaas	Kjell	Institute of Marine Research	NO
Mrs	Niedoszytko	Grazyna	National Marine Fisheries Research Institute, Gdynia Aquarium	PL
Mrs	Noronha	Ana	CIENCIA VIVA ANCCT	PO
Miss	Papathanassiou	Martha	Hellenic Centre for Marine Research	GR
Dr	Pappantoniou	Tony	Housatonic Community College	US
Dr	Pätzold	Martina	Research center MARUM, University Bremen	DE
Dr	Payne	Diana	University of Connecticut	US
Mr	Petiz	Hugo	Colégio Luso-Francês High School	PO
Miss	Pickup	Sarah	National Marine Aquarium	UK
Miss	Pinto	Ana	Zoological Society of London	UK
Mrs	Podlesińska	Weronika	National Marine Fisheries Research Institute	PL
Ms	Readman	Emmie	Marine Biological Association	UK
Ms	Realdon	Giulia	University of Camerino	IT
Ms	Rocha	Rita	Colégio Luso-Francês High School	PO
Mr	Rocha	Robert	New Bedford Whaling Museum	US
Ms	Ruddy	Ann	Redrose Developments Ltd.	UK
Mrs	Russell	Annie	Newcastle University	UK
Ms	Sam	Theodora	University of Tromso, Norway	NO
Mr	Sanchez	Jordi	SUBMON	ES
Dr	Santoro	Francesca	UNESCO	IT
Ms	Scowcroft	Gail	University of Rhode Island	US
Dr	Seys	Jan	VLIZ Flanders Marine Institute	BE
Miss	Shilliday	Kate	University of the Highlands and Islands	UK
Miss	Silva	Luisa	Colégio Luso-Francês High School	PO
Dr	Soria-Dengg	Sally	GEOMAR Kiel, Germany	DE
Mr	Strang	Craig	UC Berkeley	US
Mr	Streftaris	Nikos	HCMR	GR
Dr	Teixeira	José	CIIMAR, University of Porto	PO
Miss	Thomas	Dawn	North Wales Wildlife Trust	UK
Ms	Thompson	Kim	Aquarium of the Pacific	US
Ms	Vogt	Brynna	Copenhagen International School	DK
Mr	Wall	Dave	Ulster Wildlife	UK
Dr	Ward	Mark	Field Studies Council	UK

Dr	Wawrzynski	Wojciech	International Council for the Exploration of the Sea	DK
Ms	Wojcieszek	Dominika	National Marine Fisheries Research Institute	PL
Mr	Zwartjes	Luc	EUROGEO	BE