

Course Title: *Scientific Culture, Ocean Literacy and Engagement with Society*

Modality: CFT- Transversal Training Course

Orientation:

- Ocean Observation and Global Change
- Sustainable use of Marine Resources
- Integral Management of the Sea
- Technological progress. Engineering and Business Management

Dates: 22th, 23th, 24th, 25st, 26th & 29th May 2023

Timetable: 9:30 h to 14:00 h (GMT+1)

Duration: 27 hours

Location: Vigo (or on-line)

Language: English/Galician/Spanish

Academic coordinators:

Name	Institution	e-mail
José Pintado Valverde	IIM-CSIC	pintado@iim.csic.es

Lecturers:

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José Pintado Valverde	IIM-CSIC	pintado@iim.csic.es
Luisa Martinez Lorenzo	Delegation of Galicia CSIC	luisa.martinez@csic.es
Gabriela Ojeda Romano	IIM-CSIC	gojeda@iim.csic.es
Jaime Amaro Blanco	IIM-CSIC	jamaro@iim.csic.es
Leonor Parcero	UVigo	mparcero@uvigo.es
Patricia Quintás Pérez	IEO Vigo	patricia.quintas@ieo.es

General description:

Ocean Literacy is defined as *knowing and understanding the ocean's influence on us, and our influence on the ocean*. In the present is considered a way to advance sustainable production practices, to develop sound public marine policy, to promote a more responsible citizenry, and to encourage young people to start a career in the blue economy or in marine science.

The promotion of scientific culture, and in particular of ocean literacy, from all entities in charge of marine research and management is essential in order to increase the social impact of these studies as well as to produce socially responsible research that allows facing the United Nations' Sustainable Development Goals.

In recent times, actions aimed at involving society in marine sciences have gained special relevance to:

- Increase the level of knowledge about general science and technology issues and more specific concepts about ocean science;
- Disseminate and raise awareness about on-going research and its importance for the development of communities, especially coastal and island, but also inland;
- Inspire STEM careers among young people;
- Seek the active involvement of citizens in different stages of the scientific process.

This course, aimed at pre-doctoral researchers of the PhD Program in Marine Science, Technology and Management, offers a general approach to these issues and aims to:

- Emphasise the potential of communicating and disseminating research findings to non-specialized audiences;
- Provide them with the necessary tools, resources and collaboration networks to acquire transversal skills that allow them to carry out such communication in an effective and inclusive way;
- Train and advise the students on participative models and on incorporating responsible practices into their work, to produce scientific knowledge that responds to the needs and expectations of society.

Content:

Session Day 1

- The Scientific Method.
 - The uniqueness of the scientific method
 - An historical background. The scientific revolutions
- Scientific practice: from a project to a paper
- Science and Art, two ways of acquiring and transferring knowledge.
 - The Neuston Project
- Art, Science and Technology. *SciArt*

Session Day 2

- Science communication models and paradigms.
- Historical evolution of the different traditions: from deficit to dialogue.

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- Scientific Culture: structural and individual approaches.
 - Individual level methodologies: Sociological research, quantitative and qualitative approaches.
 - Society level methodologies: some indexes.
 - Citizen participation practices in the Engagement Era. Low-level public engagement vs high-level public engagement
 - Six pillars of Responsible Research and Innovation (RRI).

Session Day 3

- Science & fake news – how does media work?
 - The values of science and the values of the media (hooks, etc.)
 - Post-truth & uncertainty: how to balance it
 - Opinion vs. fact – Due Impartiality
 - The cycle of media: press releases, etc.
- Group Mini-exercise: write your own headline from a paper
- Engaging through social media: channels & audiences
 - Social media: a good way of getting started although it takes more time than you expect.
 - The importance of considering your audience: who are you talking to?
 - Scheduling for your mind's sake (#ScienceThursdays or whatever)& creating engaging content
- Some tools that might be of interest?

Session Day 4

- Social communication of (marine) science and technology:
 - Non-conventional public and channels.
 - Breaking stereotypes: women and technical staff.
 - New formats: different ways to bridge the gap between science and society.
 - Beyond content: basic concept of non-verbal communication.
 - Developing materials and resources for science communication.

Session Day 5

- The importance of communication in research projects. Communication as a tool for RRI practices.
- Science communication types and publics involved in a research project.
- From theory to execution:
 - The writing of the proposal and the communication plan. The strategy.
 - The budget.
 - Collaboration with other organizations.
 - The relationship with companies and communication professionals.
 - The execution, evaluation and measurement of impact.

Session Day 6

- Ocean literacy and scientific dissemination: Successful stories and Best practices
- Looking to the future: Promoting scientific vocations and STEM (Science, Technology, Engineering and Math's) careers among young people.
 - Gender and Ocean: Inspiring scientific vocations through the life and work of pioneers and current women at Oceanography.
 - Science is for Everyone: Dissemination activities, a participative tool for researchers to bring science closer to society.
 - Exercise: How can I disseminate my research?

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- Science with and for society: Citizen Science projects.
 - Exercise: Science dissemination: a project or a work packed project?
 - Building “oceanic literacy” networks: European expert groups (EuroGOOS, EMB and EuroOcean).

Final Project

- Joint event on the 8th

Teaching methodologies:

Practical and theoretical sessions.

Evaluation system:

Grade pass or fail depending on the percentage of attendance and the results of the practical sessions.

Brief CV of the lecturers:

Dr José Pintado Valverde. Permanent researcher CSIC and Deputy Director of IIM-CSIC performs research in the Marine Ecology and Resources Department of the IIM-CSIC. He has worked before as Post-doctoral at the French *Institut de Recherche pour le Développement* (IRD) at Montpellier (1995-2001), has been Lecturer at the University of Montpellier II (2001-05) and Visiting Fellow at the University of New South Wales (2012). His research areas are: applied microbiology, microbial ecology, and biology and physiology of cultured marine species, including endangered fish species for biodiversity conservation or macroalgae in multitrophic aquaculture. He has participated in several national and international research projects related with marine research, comprising EC-funded projects, and has published over 40 papers in international journals and book-chapters.

He has an active outreach and educational activity and participates regularly in events such as the Science Week or the European Researchers' Night, and in educational activities for schoolchildren such as Exper-i-Ciencia CSIC. He has also participated in radio and TV science programs, as Tres14 for RTVE or documentary films as SyngDoc. He was coordinator and curator of the exhibitions of the Neuston Project, a collaborative project between scientists and artists, presented at Euroscience Open Forum (2008, Barcelona) and showed at the Galicia Sea Museum (2009) and the Cervantes Institutes of Brussels and Fez (2011). He has also been Editor of the Neuston book (2009) and contributed to workshops, conferences, events and publications on Science and Art, as well as teacher in the MSc program *Contemporary Art. Creation and Research* of the University of Vigo.

Dr Luisa Martínez Lorenzo. Leader of the Scientific Culture and Innovation Unit of the CSIC's Delegation in Galicia since 2008, where she coordinates, offers consultancy and gives support to outreach and science communication initiatives. She holds a PhD. in Marine Science. Her role includes bringing science closer to society, giving visibility to women in science and highlighting the work of scientific and technical staff. She has experience in the development and management of science communication projects and actions, especially those seeking interaction with culture. She took part in several conferences and courses related with communicating science and technology for children and the visibility of women in research.

Regarding publications, Luisa participated in “Contos e Coplas de Estrelas” re-launch within the International Year of Astronomy 2009; coordinated the learning material “La ciencia del Mejillón” (2010) with professor XA Álvarez Salgado; and co-authorshiped the didactic units of “La esfera del

agua” exhibition (2013) and the “Ciencia en el puerto” project (2007 and 2018 editions). In the audiovisual field, she was the coordinator of the play “A linguaxe dos bosques” (2010) and the screenwriter of the short films “Da igual como seas” (2018), “10 años divulgando la ciencia” (2018), “Píldoras CSIC de Conocimiento” (2020) and episodes 1º and 2º of “Ciencia Salvaje” (2018, 2020), among other productions. She was also the screenwriter of the scientific play “Que traballo tan curioso!” (CSIC) in which she also participates on stage. Enthusiast about illustration, in 2017 she did a Master's degree in Illustrated Children's Album. She is the author and illustrator of the informative album “Puf! Vaia peido...” (2018), published by Editorial Galaxia, which has been included in the catalogue of the Spanish Organization for Children's and Youth Books (OEPLI, from its Spanish acronym), among the most outstanding works published in the state in 2018. Since 2019 she has been the director of the science communication collection “Lanterna de Aristóteles” (Editorial Galaxia). Luisa has been part of the Galician Association for the Communication of Scientific and Technological Culture (DivulgAcción) since its foundation

Dr Gabriela Ojeda Romano. Public Engagement Officer at the Engagement with Society Unit, IIM-CSIC. She is a social researcher in the *Science, Technology and Society* field. She holds a PhD in Humanities (“Scientific Culture in Higher Education Institutions: means and strategies for communicating science and technology”, Universidade da Coruña, 2019) and her research areas are: Science Literacy, Public Perceptions and Attitudes towards Science and Technology studies, Responsible Research and Innovation and Public Engagement with Science. She has a BSc in Biology from University of A Coruña and a MSc in Scientific, Medical and Environmental Communication from Universitat Pompeu Fabra.

Before joining the IIM-CSIC, Gabriela had the Science Communication and Outreach Officer role at Advanced Scientific Research Center (CICA-UDC) in charge of disseminating research findings and translating them to non-specialist audiences. Previously, she has been part of the European Commission’s science and knowledge service, Joint Research Centre, working on communicating science to influence policy. Gabriela worked as well as a Public Engagement Officer at Swansea University (UK) helping on the evaluation of public engagement projects in order to report their social impact within the 2021 Research Excellence Framework. She also took part in the NERRI 7FP Project (*Neuro-Enhancement Responsible Research and Innovation*) as a research assistant at the Studies Center on Science, Communication and Society of the Universitat Pompeu Fabra (Spain).

Jaime Amaro Blanco. Communications Officer at the Engagement with Society Unit, IIM-CSIC. He is a science communicator & biologist, interested in Science, Technology & Society (STS) research, SciArt initiatives & social dialogue and deliberation. After undertaking a BSc (Hons) Biology at Universidade de Santiago de Compostela, he enrolled in the MSc Science Communication & Public Engagement with Science at the University of Edinburgh (Scotland). He has taken positions in different fields of science communication and community engagement, working as a performer & communicator at Edinburgh Science’s Generation Science Tour, managing and evaluating community engagement activities at Science Ceilidh’s Leith Labs Programme, including two European Researcher’s Night activities, and as an intern at Science Media Centre in London. After joining IIM-CSIC, his focus has moved towards digital engagement, including social media campaigns, many during covid-19 lockdown.

Leonor Parcero López. Manager of the Scientific Culture and Innovation Unit at the University of Vigo, she has a BSc in Advertising and Public Relations and is developing her doctoral thesis on science communication and dissemination. She has been working in science communication since 2008, when she joined GRADIANT, the Telecommunications Technology Centre of Galicia as Communication Officer, where she participated in and organised different outreach projects with public funding, in addition of being responsible for communication and publicity of R&D&i projects. Since then she has given talks and conferences at national and international events as an expert in science communication, both in their professional performance and representing the DivulgAcción,

the Galician Association for Communication of Scientific and Technological Culture, which she has chaired since 2015 and is a founding partner. As a freelance professional, Leonor has participated and developed outreach projects funded by the Administration, having taken part in 17 initiatives up to now. She has been hired by the three Galician universities for: designing and implementing the communication and graphic communication of awards; leading the communication of research groups or networks; or managing and giving form and content to institutional websites (such as the new website of the University of Vigo). Her merits and curriculum can be consulted on her LinkedIn profile and on her personal website www.leonorparcero.com.

Dr. Patricia Quintas Pérez has a BSc and PhD in Marine Science (Outstanding *Cum Laude*/Extraordinary Prize, UVIGO) with professional experience in social science communication at public institutions (UVIGO, CSIC, IEO) and the private sector.

Her scientific career included two research lines: benthic communities and aquaculture of seahorses for conservation. She participated in 13 research projects, 21 publications, 71 congress and 2 research stays (Tasmania, 2009 and China, 2011). In 2011 she increased her professional activity in Social Science Communication in collaboration with UVIGO and UCC+i CSIC-Galicia. Recently, from 2019 to 2022, she worked as Research Support Technician at the Centro Oceanográfico de Vigo (Instituto Español de Oceanografía (IEO, CSIC) where she created the first Scientific Culture and Innovation Unit of the IEO (UCC+i IEO) (2019). Her main role was the coordination and management functions of the Unit, and the dissemination of research and advisory functions of IEO to the society, designing, coordinating and executing dissemination projects and events, giving support to research projects and applying for funds.

Relevant activities: 26 workshops (Mergúllate no océano 2011, 2013, 2014); World Oceans Day (2013, 2019); 9 storytelling (Don caballito de mar, 2016), 12 conferences (11F event), 1 paper about marine litter and Twitter (*Mar. Pol. Bull*, 2021), 1 post (Blog Oceánicas de hoy), 1 press article (Ciencia cotiá, 2022), 3 educational materials (Marine litter guide, 2021) and 3 congress (Global Oceans 2021). At IEO she coordinated some actions in events (World Oceans Day; Aquaculture Day, Science week), some scientific culture projects (European Researcher's night, 2019; Mar Interior, 2020; Oceánicas, 2019, 2022; GNight, 2021) and gave support to research projects (CleanAtlantic, II Red PNMTIAG, ICONO). Engaged with teaching, she is accredited as Assistant Professor PhD (ANECA) and she conducted courses to university students, secondary and high school students and teachers. She was a lecturer in the first edition of this PhD course "Scientific Culture, Ocean Literacy and Engagement with Society" (2021). Nowadays, she is doing the "Master Universitario en Comunicación Social de la Investigación Científica" (VIU).

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Other Links:

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MIT Program in Art, Culture and Technology (ACT) MediaLab MIT, Cambridge, Massachusetts.
www.media.mit.edu

Science & Art. Wellcome Collection, Londres <https://wellcomecollection.org/articles/science-art>
Science Galery, Trinity College, Dublín <https://dublin.sciencegallery.com>