

## **Deliverable 4.1**

### **Optimised Online and Offline Trainings**



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## Introduction

*“It would be wrong to imply that researchers and funding bodies are not aware of the concepts of Open Science and RRI. However, going from awareness to actual application in daily research activities is a big step. For many, taking this step seems impossible due to real or perceived constraints of basic research or funding policies. To lower the threshold for application, we aim to provide training for our target audiences in RRI and Open Science concepts and tools, and show how these can be applied in fundamental research and funding processes and decisions.” ORION Grant Proposal, 2016.*

Since the beginning of the project WP4 has been building online and offline trainings in Open Science and RRI. This process has included a gap analysis of existing training in European Life Science institutes, pilot workshops for funders and researchers, and finally optimised workshops which offer a flexible yet consistent format across a range of contexts (full day, half-day, and conference slots).

In addition, a number of online materials and events have been delivered, such as webinars, Twitter live chats, a podcast series (the ORION Open Science Podcast), and finally a MOOC for researchers which will go live next month. All these activities are detailed below.

## Objectives

- Task 4.1 Design training on RRI and Open Science concepts and tools for scientists and staff at funding agencies (Lead: MDC, M1-24)
  - Sub-task 4.1.1 Design a series of offline/online workshops (Lead: MDC; Partners: CRG and UAB)
  - Subtask 4.1.2 Pilot workshops (Lead MDC, Partner CRG, ISCIII, M18-24)
- Task 4.2 Train scientists and funding bodies in RRI concepts and methods (Lead: MDC, Partners: CRG, BI, MU, ISCIII, VA, ANT, M24-36)

## Gap Analysis

As we wanted to understand which kind of Open Science trainings were being offered to junior researchers we did a gap analysis, focusing on institutes similar to ours, researching in life sciences. The gap analysis was done as a program analysis--which is an established research method of Adult Education Studies and looks at the courses and educational programs offered from institutes or organizations for a certain target group.<sup>1</sup>

The program analysis of the EU-LIFE alliance<sup>2</sup> professional development trainings was carried out framed with the question: are we heading towards Open Science through trainings. The course programs for the year 2018 were looked at under the aspect of training in Open Science skills in trainings in professional development and transferable skills. The material that was used

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<sup>1</sup> Käpplinger, B. (2016). *Generations of Adult Education Programs – Lost and Found Imaginations*. Paper bei der Triannual ESREA Research Conference, Maynooth, Sept. 2016. Retrieved from [https://www.researchgate.net/publication/314197714\\_Generations\\_of\\_Adult\\_Education\\_Programs\\_-\\_Lost\\_and\\_Found\\_Imaginations](https://www.researchgate.net/publication/314197714_Generations_of_Adult_Education_Programs_-_Lost_and_Found_Imaginations).

<sup>2</sup> <https://eu-life.eu/>

for this analysis is self-assessed and does not make the claim of completeness. It is a compilation of extractions from websites, e-mails, posters, word documents and excel tables. It was taken from the websites of the institutes or given to us from the people organizing the trainings.

In order to record the courses properly it was important to define all practices of Open Science so that courses were identified even if they are not marketed under the catchword Open Science. The course programs were looked at in terms of skills in Open Access, Open Data and Science Communication and Public Engagement, collaboration tools and Citizen Science. Science Communication, in terms of Open Science, was limited to communicating science outside of the scientific realm.

The research question was, in general, which kind of professional development courses are offered to researchers within the EU-LIFE institutes and which content is being offered to equip researchers with tools in Open Science and with which focus?

From the course programs for the 13 European institutes 207 courses were gathered and sorted into different types of courses that were offered. It could be identified on the one side that there was a set of core courses that almost each institute offer their doctoral and postdoctoral researchers. On the other side the trainings offered are very institute specific. Not only does the amount vary between institutes, but also the focus and content.

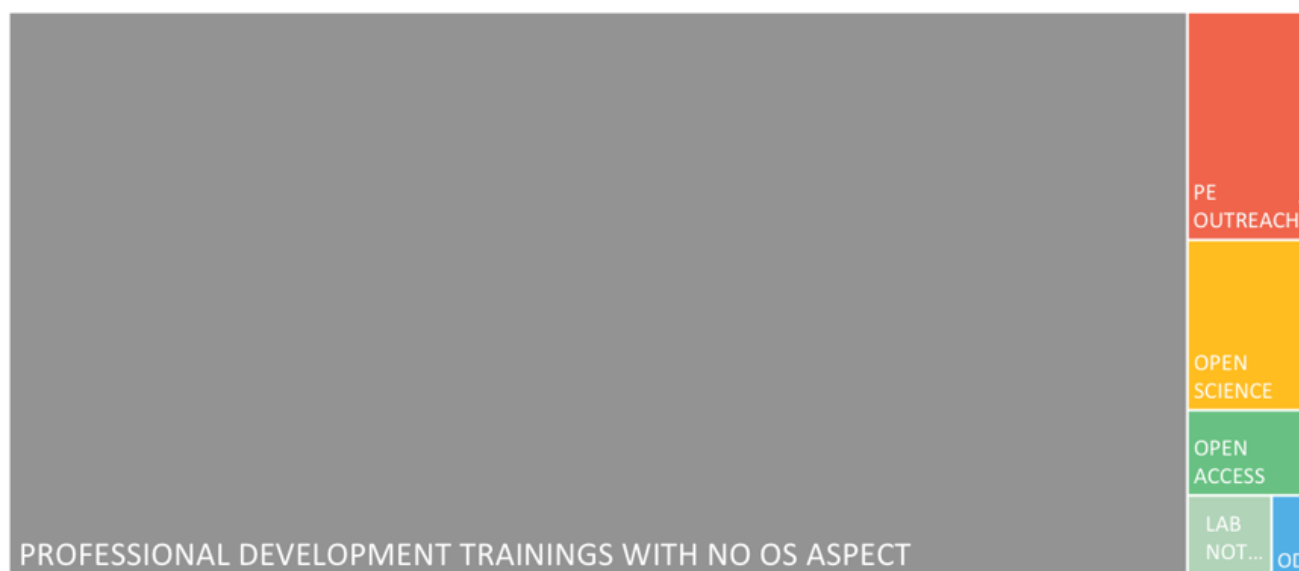


Figure 1 EU-LIFE Trainings 2018 Open Science Courses vs. Non-Open Science Courses

From the 207 courses 20 of the courses offer some skill in Open Science. Figure 1 illustrates the ratio between courses that have no aspect of Open Science and those that do.

Of the 20 Open Science courses, communicating and engaging with the public are the best represented, eight courses fall under this category. The six courses with the topic of Open Science are all carried out by one of the ORION partners, half of them are ORION activities themselves. Under Open Access there are three courses that specifically deal with how to publish an Open Access paper and there is one course dealing with sharing data. Two courses were found in using

the electronic lab notebook<sup>3</sup>. The rest of the courses for 2018 from the EU-LIFE institutes do not deal with any aspect of Open Science.

Figure 2 shows the distribution of Open Science courses distributed between the EU-LIFE institutes.

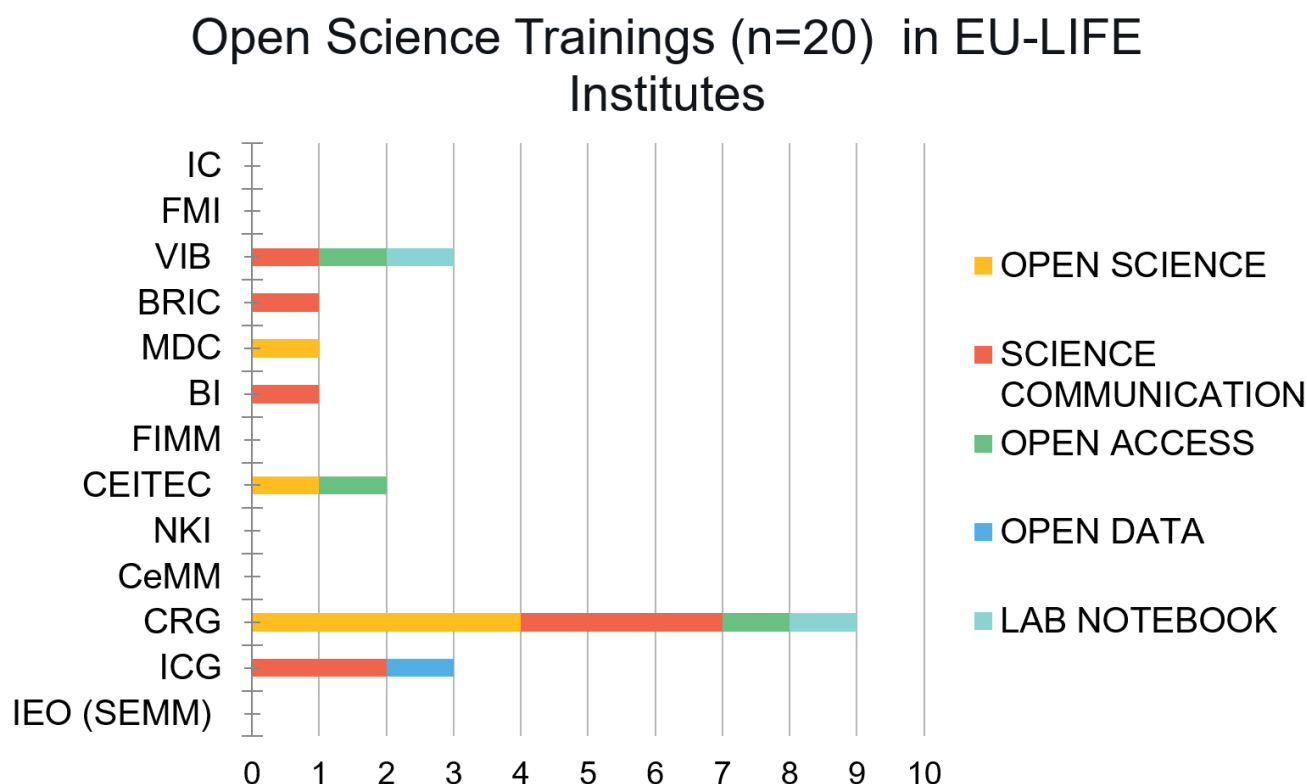


Figure 2 Overview of Trainings in EU-LIFE Institutes with an Open Science Content

CRG, as the ORION project leader is offering the most courses to equip scientists with tools to practice Open Science and the courses dealing directly with Open Science are solely in one of the ORION partner institutes.

A detailed list of the names of the courses with an Open Science content can be found in Figure 3. Skills in Open Access and Open Data are surprisingly underrepresented, as researchers deal with creating and managing data on a regular basis as well as publishing. It is possible that skills in these areas are acquired through other activates other than informal trainings.

In general, one of the major topics offered to PhDs is writing a scientific paper. From the almost twenty courses from the EU-LIFE institutes focusing on writing and publishing skills only one of them explicitly mentions open access publishing in the course description. These courses would be a good place to start introducing the concept of Open Access and the different possibilities of publishing.

<sup>3</sup> This finding is not inclusive. Due to the fact that the professional development and transferable courses were assessed it is highly likely that some institutes offer electronic lab notebook courses under IT skills and are therefore not accounted for.

TITLE	INSTITUTE	OS	OA	OD	OUT-REACH	LAB NB
ORION Introductory course – Benefits of OS for you	MDC	1				
ORION National Stakeholder Workshop	CEITEC	1				
ORION B-Debate – co-creation experience to develop a roadmap and recommendations	CRG	1				
OS Train the Trainer Bootcamp	CRG	1				
Event 'Wiki Role of Wikimedia in Open Science'	CRG	1				
Introduction course for PhD's	CRG	1				
Barcelona Science Slam (workshop+event)	CRG				1	
Science Communication and Public Engagement	VIB				1	
Science Communication Course'	IGC				1	
A half day training for researchers who share ideas on communicating with the public using media	BI				1	
Communicating Science in a Digital Age	BRIC				1	
Make your research viral: social networks and science	CRG				1	
Social Media for Scientists Course	IGC				1	
Explaining your research to ANYONE - inside or outside science	CRG				1	
Research Data Management Course	IGC			1		
Scientific Writing and Publishing	VIB		1			
Open Access (using repositories and ORCID)	CEITEC		1			
Science in Action: Politics and practice of publication	CRG		1			
Electronic Lab Notebook Introduction	VIB					1
Electronic Lab Notebook	CRG					1

Figure 3 Overview of the EU-LIFE Open Science Course Titles

If the same analysis would be done in 2019 it is possible to imagine that more courses could be found. Answering the question of are we are heading towards Open Science though trainings is a matter of perspective. There seems to be a well-established cultural of communicating and sharing science outside of the science community that is being pushed forward through courses in working on communicating skills and using social media. This type of course seems to have developed quite independently from the Open Science discourse but follows the same principals to open science up to society. Non the less only half of the EU-LIFE institutes offer a communication course for communicating with a lay audience.

If one thinks away the trainings initiated from ORION and those on communication skills, what is left over on courses that are supporting skills in Open Science is bleak. The amount supporting skills in Open Access and Open Data are relatively shocking. Here the questions is, how and with whom are skills and competences in data management and publishing achieved--are they meet internally within the working groups and therefore not represented in trainings because the need is covered through other means? Or are we seeing a deficit in this area?

Courses in terms of opening up the entire research cycle and involving the public in research are non-existent the courses here are limited to spreading scientific results. The infrastructure of offering trainings exist, there are a lot of courses that are being offered that could incorporate more aspects of Open Science, such as OA publishing as an aspect that is embedded into courses on writing skills. There are trainings that are pushing Open Science forward and the trainings funded by the EC are adding to the Open Science training landscape. However, we are heading towards Open Science through training when skills in Open Access, FAIR data, and communicating science to lay audiences (e.g. lay summaries) are on the daily agenda and become an institutional norm. And when there are training options that reflect opening the research cycle and involving different stakeholders and experts to contribute, for example though Citizen Science.



## All Workshops and Training Events

Date	Location	Stakeholders	Event	Content	Duration
25.01.2018	Maple House, Birmingham, UK	<ul style="list-style-type: none"> <li>Policy Makers</li> <li>Education Community</li> </ul>	'Preparing Researchers for an Unknown Future: Cultures, Behaviours & Mindsets' Vitae Symposium	<i>Opening Minds, Changing Habits, Talk</i>	60 mins
18-20.04.2018	CRG, Barcelona, ES	<ul style="list-style-type: none"> <li>Researchers</li> </ul>	FOSTER Bootcamp	Attended	3 days
27.04.2018	Aula der Wissenschaften, Vienna, AU	<ul style="list-style-type: none"> <li>Project Coordinators</li> <li>Researchers</li> <li>Education Community</li> </ul>	2nd HEIRRI Conference: Education towards a responsible society, transforming universities through RRI	x6 'Speed Talks' on ORION Open Science Training	60 mins
03.05.2018	STATION, Berlin, DE	<ul style="list-style-type: none"> <li>Citizens</li> <li>Researchers</li> </ul>	Re:publica Session	<i>Doctor, Doctor, Where is my Digital Diagnosis? Citizen Science Interactive Workshop with MDC Scientists and Citizens</i>	90mins
30.05.2018	Corvinus Business School, Budapest, HU	<ul style="list-style-type: none"> <li>Project Coordinators</li> <li>Researchers</li> <li>Education Community</li> </ul>	Living Knowledge Conference	<i>How does Open Science benefit researchers? Interactive Workshop</i>	60 mins
05.06.2018	Maison Communale de Plainpalais, Geneva, SW	<ul style="list-style-type: none"> <li>Project Coordinators</li> <li>Researchers</li> <li>Education Community</li> </ul>	ECSCA, European Citizen Science Association Conference 2018	<i>Swipe right for Open Science: How to create the perfect match for Citizen Science? Interactive dialogue session</i>	90 mins
18.06.2018	ISCIII, Madrid, ED	<ul style="list-style-type: none"> <li>Funders</li> <li>Research</li> </ul>	Pilot Researcher Workshop	<i>Open Science and the Funding</i>	Full Day



		Managers		Management Process	
12.07.2018	Esplanade Compans Caffarelli, Toulouse, FR	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	ESOF 2018 Toulouse	<i>Does Open Science Improve Your Career Prospects?</i>	90 mins
14.07.2018	Charite, Berlin, DE	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Early Career Scientist Forum on GPCR Signal Transduction (ECSF-GPCR)	<i>Introduction to Open Science Seminar</i>	60 mins
27-29.09.2018	MDC, Berlin, DE	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	MDC PhD Retreat	<i>Open Science and Podcasting</i>	120 mins
11-12.10.2018	University of Valletta, Malta	<ul style="list-style-type: none"> <li>• Project Coordinators</li> <li>• Researchers</li> <li>• Education Community</li> </ul>	4th NUCLEUS Conference	<i>Motivate public, administrators and researcher's engagement through arts</i>	120 mins
09.10.2018	MDC, Berlin, DE	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Pilot Researcher Workshop	<i>The Benefits of Open Science For You!</i>	Full Day
28.11.2018	Webinar	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	#ECRWednesday Webinar: Arts in Science Communication	<i>nHear about how science can be effectively communicated to a broader audience using arts.</i>	90 mins
29.11.2018	Vitae Webinar	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Webinar	<i>Open Science: What, Why, How?</i>	60 mins
29.11.2018	Live Twitter Open Science Q&A	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Live Twitter Q&A	<i>#vitaechat</i>	60 mins
18.01.2019	TU Braunschweig, Braunschweig, DE	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Researcher Training Workshop	<i>Open Science and You</i>	Full Day
21.03.2019	Institut Curie, Paris, FR	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Researcher Training Workshop	<i>Open Science and You</i>	Full Day
25.3.2019	Technion, Nasholim, IS	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	SignGene Exchange Programme,	<i>Science Communication and Storytelling</i>	90 mins

			Winter School 2019	Workshop	
3.4.2019	Draken Folkets Hus Gothenburg SWE	<ul style="list-style-type: none"> <li>• Project Coordinators</li> <li>• Researchers</li> <li>• Education Community</li> </ul>	The Forum for Science Communication (Forum för forskningskommunikation)	<i>When arts meet science</i>	120 mins
3.4.2019	Draken Folkets Hus Gothenburg SWE	<ul style="list-style-type: none"> <li>• Project Coordinators</li> <li>• Researchers</li> <li>• Education Community</li> </ul>	The Forum for Science Communication (Forum för forskningskommunikation)	<i>Why should the public be engaged in science?</i>	120 mins
08.04.2019	Univ. Pompeu Fabra., Barcelona, ES	<ul style="list-style-type: none"> <li>• Funders</li> <li>• Research Managers</li> </ul>	Funder and Research Manager Training Workshop	<i>Open Science and Funding</i>	Half Day
10.04.2019	Univ. Pompeu Fabra., Barcelona, ES	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Researcher Training Workshop	<i>Open Science and You</i>	Half Day
2.5.2019	JCMM, Brno, CR	<ul style="list-style-type: none"> <li>• Funders and Research Managers</li> </ul>	Funder and Research Manager Training Workshop	<i>Open Science and Funding</i>	Full Day
3.5.2019	JCMM, Brno, CR	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Researcher Training Workshop	<i>Open Science and You</i>	Full Day
23.05.2019	MDC, Berlin, DE	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Brain Tumor Meeting	<i>Open Science and You</i> Lunchtime Seminar	90 mins
01.07.2019	st. Shevchenko, Odesa, UE	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	DAAD German-Ukrainian Summer School: „Perspectives in Biomedicine with a Focus on Cancer Immunotherapy“	<i>Open Science and your research</i> Workshop	45 mins
03.07.2019	Odesa, UE	<ul style="list-style-type: none"> <li>• Funders</li> <li>• Administrators</li> <li>• Researchers</li> <li>• Entrepreneurs</li> </ul>	Biotech&Pharma Cluster Lviv	<i>Benefits of Open Science</i>	60 mins
05.07.2019	Landesakademie	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Helmholtz	<i>Open Science</i>	120 mins

	für Jugendbildung, Weil der Stadt, DE		Graduate School of the German Cancer Research Center (DKFZ) PhD Retreat	<i>and your research Workshop</i>	
11.07.2019	Odesa, UE	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	Odessa I.I. Mechnikov National University	<i>Open Science and your research</i>	90 mins
14.07.2019	Alfândega Congress center, Porto, PL	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	The XIV European Meeting on Glial Cells in Health and Disease conference	<i>Open Science and You Lunchtime Seminar</i>	90 mins
28.08.2019	MDC, Berlin, DE	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	MDC PhD Retreat	Open Science MOOC Focus Group and Beta Testing	90 mins
3.9.2019	Live Chat Webinar	<ul style="list-style-type: none"> <li>• Funders and research managers</li> </ul>	Live Chat Webinar	<i>Let's Talk: What Open Science Means for Funders and Research Managers</i>	90 mins
16.09.2019	Alfândega Congress center, Porto, PL	<ul style="list-style-type: none"> <li>• Project Coordinators</li> <li>• Researchers</li> <li>• Education Community</li> </ul>	Open Science Fair 2019	<i>LESSONS LEARNED FROM A YEAR OF EUROPEAN OPEN SCIENCE TRAINING (ORION PROJECT) Interactive Workshop</i>	120 mins

## Pilot Workshops

### Funders

*ICSIII, Madrid, ES, June 18th 2018*

The pilot workshop for funders was designed by the MDC team. It was delivered with the addition of several new activities in collaboration with the CRG and FOSTER+. It was also hosted and partly organised by ICSIII. The workshop ran for a full working day and included a presentation on Open Science information as well as a large range of interactive group exercises such as case studies, assessment of current evaluation criteria, brain writing, role play exercises, and individual action plans. The feedback was positive overall and a number of important ideas emerged which have been fed into the optimised training workshops.

## Researchers

MDC, Berlin, DE, October 9th 2018

The researchers pilot workshop was organised, designed, and hosted by the MDC. It was a full day workshop and a number of training activities and approaches were tested, several of which became fixtures of the optimised training e.g. the 'Meet the Expert' session. The evaluation team from UAB observed and undertook in-depth evaluation of the training that included both trainers and participants.

## Offline Training

### Locations and attendees

ORION training workshops have been delivered for the staff and researchers of three of the partner institutes (Spain, Germany, Czechia) and are planned for the remaining three this Autumn. In Germany the MDC was the location of the pilot workshop (09.10.2018) and the feedback from researchers who attended that was invaluable (see section X above). The optimised workshops began in January 2019 in TU Braunschweig. The ORION training team had been invited to hold an open science training event at TU Braunschweig by a PhD researcher who had attended the *Does Open Science Improve Your Career Prospects?* short workshop at ESOF 2018. This has become a pattern over the course of the project, people who attend shorter training workshops at conferences or summer/winter schools then either directly request a longer workshop at their institution or recommend the ORION training team to others looking to provide Open Science training. This reinforces the importance of balancing large full day workshops with shorter workshops that are part of other events in order to achieve maximum reach and long term impact.

In both Spain and Czechia the ORION training team delivered two back-to-back workshops, one for funders and research managers and another for researchers. The workshops in Spain were hosted by Pompeu Fabra University rather than CRG, although the workshops were promoted to researchers and staff of the CRG. The reason for this was that since CRG were partners in the FOSTER+ project they have already provided quite extensive Open Science events for their researchers. In Czechia the workshops were hosted by JCMM. In addition, Institut Curie, part of the EU-Life organisation, also hosted an ORION training event for researchers.

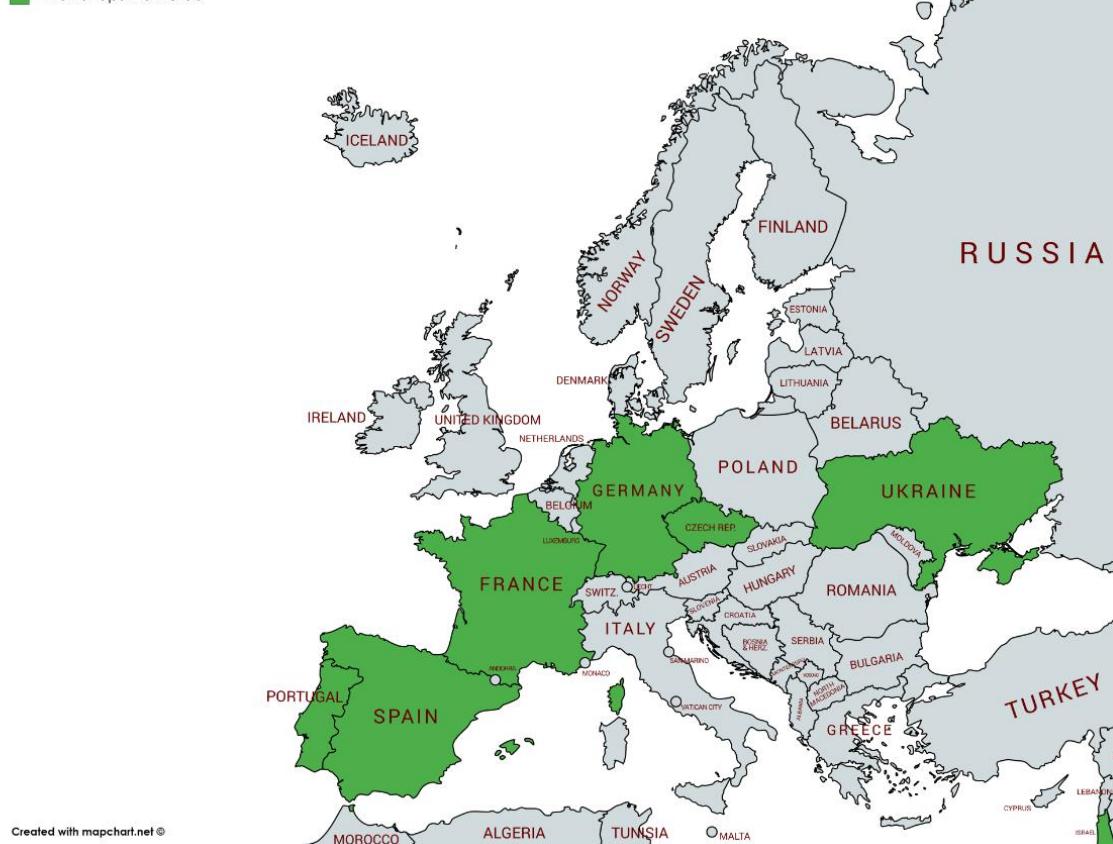
The attendance for workshops has ranged from 18 to approx. 9, with an average attendance of approx. 12. It has become clear that this is a good number for an interactive workshop, it is hard for larger groups to share ideas and have space to do activities effectively, while smaller groups do not have enough participants to learn from each other as well.

The researcher workshops have been predominantly attended by PhD researchers, with a small number of postdocs in attendance as well. Despite the early stage of their career, a number of attendees have experience with various aspects of Open Science (e.g. they have published a preprint or done a science communication event). This creates a good balance of experiences and facilitates peer-to-peer learning.

The funders workshops have not been attended solely by those who are employed directly by funding institutions. Research managers who work at institutions and provide support to researchers looking to fund or manage research projects have also been in attendance. In addition, project coordinators from related projects have also wanted to attend (e.g. Andrea Tousca from the NUCLEUS project).

# ORION Training Workshops

Workshops Delivered



Created with mapchart.net ©

## Overview of Optimised Offline Full and Half Day Training Workshops Delivered

Date	Location	Target Group	Attendance	Duration
18.1.2019	TU Braunschweig, Braunschweig, DE	ECRs	9	09:30 – 16: 30
21.3.2019	Insitut Curie, Paris, FR	ECRs	12	09:30 – 16: 30
8.4.2019	Univ. Pompeu Fabra., Barcelona, ES	Funders and Research Managers	12	10:00-14.30
10.4.2019	Univ. Pompeu Fabra., Barcelona, ES	ECRs	15	10.00-14.30
2.5.2019	JCMM, Brno, CR	Funders and Research Managers	10	10.00-17.00
3.5.2019	JCMM, Brno, CR	ECRs	14	10.00-17.00

## Format



Photos: Eva Hnatkova, JCMM, Brno

The format for the offline workshops was developed to be as interactive as possible and to enable peer-to-peer learning while ensuring participants leave with a baseline of knowledge about Open Science and RRI. We have developed three format variations that fulfil this goal. These are a full day workshop which runs for approx. six hours, a half day workshop which runs for approx. four hours, and a conference slot workshop which run between 90 and 120 mins. All three workshops include interactive activities, a presentation of Open Science content, and individual action plans.

We have developed a number of activities that encourage participants to engage and learn from each other as well as to develop their ideas and understanding of Open Science practices:

### Open Science Question Board

At the beginning of half and full day workshops the participants are given three cards, each a different colour. After a short introduction round each participant was given the task to write down on three cards their:

1. Definition of Open Science
2. Why they are participating in the workshop (reason/ motivation)
3. The question they would like to have answered by the end of the workshop

These cards are then collected and displayed. From the first question, we usually see that the range of understanding about Open Science is very heterogenic and that some participants have a substantial knowledge in one aspect of Open Science, but are unaware of the other surrounding concepts, while other participants only have very broad ideas about what Open Science could be. The second card gives us an understanding of what the background and expectations of the



participants are and enables us to see if there is a pattern in participant's motivation for attending. The third card is gives us further insight into the participants' existing understanding and we return to the collected questions at the end of the workshop to ensure everyone has had their questions answered.



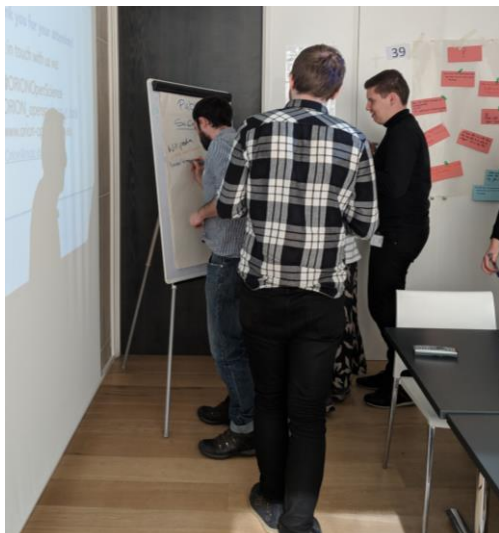
## Card Activity

This activity adapts from two separate activities developed by FOSTER+ and HEIRRI. Each of these projects have produced cards with statements about Open Science and RRI on them (e.g. 'Both positive and negative results of research projects should be published' or 'It should be easier for citizen scientists to publish their work in a scientific journal'). The main purpose of these cards is as a method of prompting discussion between the workshop participants. In ORION workshops we give each participant a card and ask them to read the statement and form an opinion on the issue it describes. The participants stand and find a partner, the two participants then exchange their opinions on the card and discuss the topics, the participants then each find a new partner in order to discuss their card with a new person and learn about that person's card, this can continue for several turns in a full day workshop or only once for a conference slot workshop. The activity works to encourage participants to think about the principles behind Open Science and RRI, as well as form their own opinions on different topics. It also works as an ice-breaker exercise that gets participants to meet each other.

## Brain Walking

Three flip charts are placed in a circle with the headings: Open Access, Open Data and Public Engagement. Each participant is given a marker and are instructed to silently walk from flip chart to flip chart and write down any actions or ideas they have about how researchers or funders (depending on the workshop participants) in general could practice Open Science. For example, under Open Data participants often write the name of some repositories. The participants were encouraged to use the things the others wrote to inspire them. This exercise often allows quieter participants to engage in peer-to-peer learning, and it creates a written resource (a photo of which is sent to them later via email).





### **Role Play**

In this activity participants split into groups of 3 or 4 people. One person in each group assumes the role of the 'bad guy', a person who is against adopting Open Science and RRI practices. In researcher workshops this is usually a PI or Group Leader, in funder and research manager workshops it is usually a Director or Head of Department (we make no comment about these choices). The other two or three participants have to persuade the 'bad guy' to change their mind about Open Science. The participants seem to enjoy this activity very much and are very enthusiastic about adopting their roles. The activity allows participants to articulate and answer their own doubts in an informal way.

### **Case Studies**

WP4 have also produced three short case studies or scenarios on public engagement, preprints, and data sharing. The scenarios are supported by several prompt questions. This activity can either be done by all participants, with the moderator reading out the scenarios and then writing the answers on a flipchart, or as three groups which then all feedback to the whole workshop.

### **Presentation**

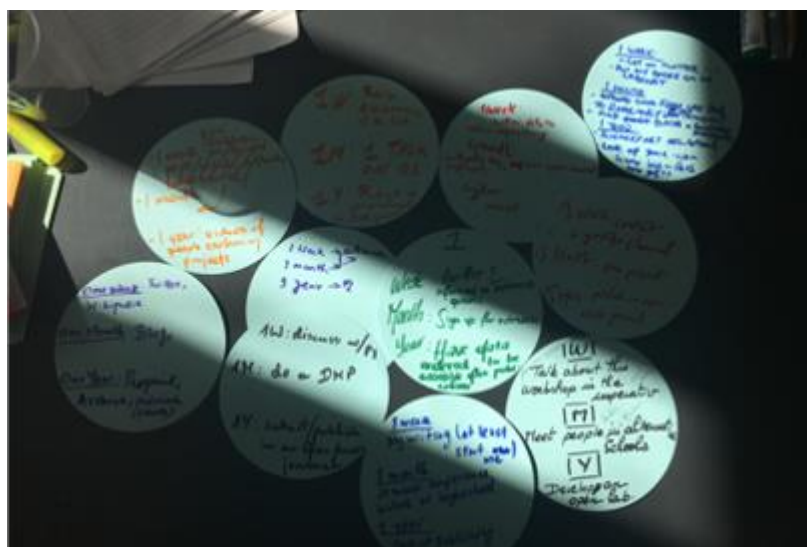
The presentation lasts between 20 mins and 60 mins depending on the length of the overall workshop. In it the moderator outlines the key information about Open Science (e.g. how to publish Open Access, what the difference between Science Communication and Public Engagement is, what FAIR stands for, etc.). The presentation has developed into a fairly interactive element of the full and half day workshops because participants often have firsthand experience of the topics being discussed and can share that experience with other participants, thus this session involves more peer-to-peer learning than a traditional presentation.

### **Meet the Expert**

This session is only possible in the full and half day workshops. The basic premise is that a local Open Science expert comes to the workshop and discusses Open Science topics specific to that institution and/or country. In TU Braunschweig the experts were two librarians from the institute who were running an Open Access program and in Pompeu Fabra University the expert for the researchers was a legal expert in copyright.

## Individual Action Plans

The last activity in the trainings is to create an Individual Action Plan (IPA). The participants are asked to synthesis the information of the day and come up with their own individual actions they want to take in the future to contribute to Open Science. They are asked to write down what they will do in the next one week, one month and one year and then share them with the group.



As we noticed in the first workshop the individual action plans seemed interesting and valuable, we started reordering them and came up with an analysis scheme to understand and sort which types of actions participants of the ORION trainings are planning to take. From the 6 workshops and 2 conferences given in 2019, 118 individuals have planned altogether 286 individual actions towards practicing Open Science.

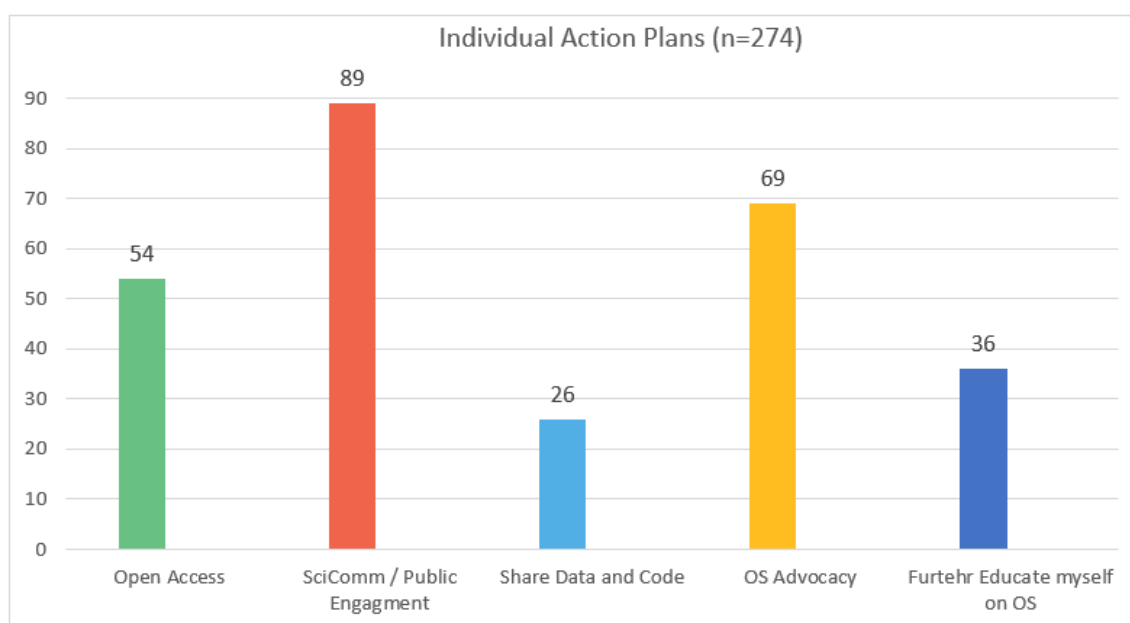
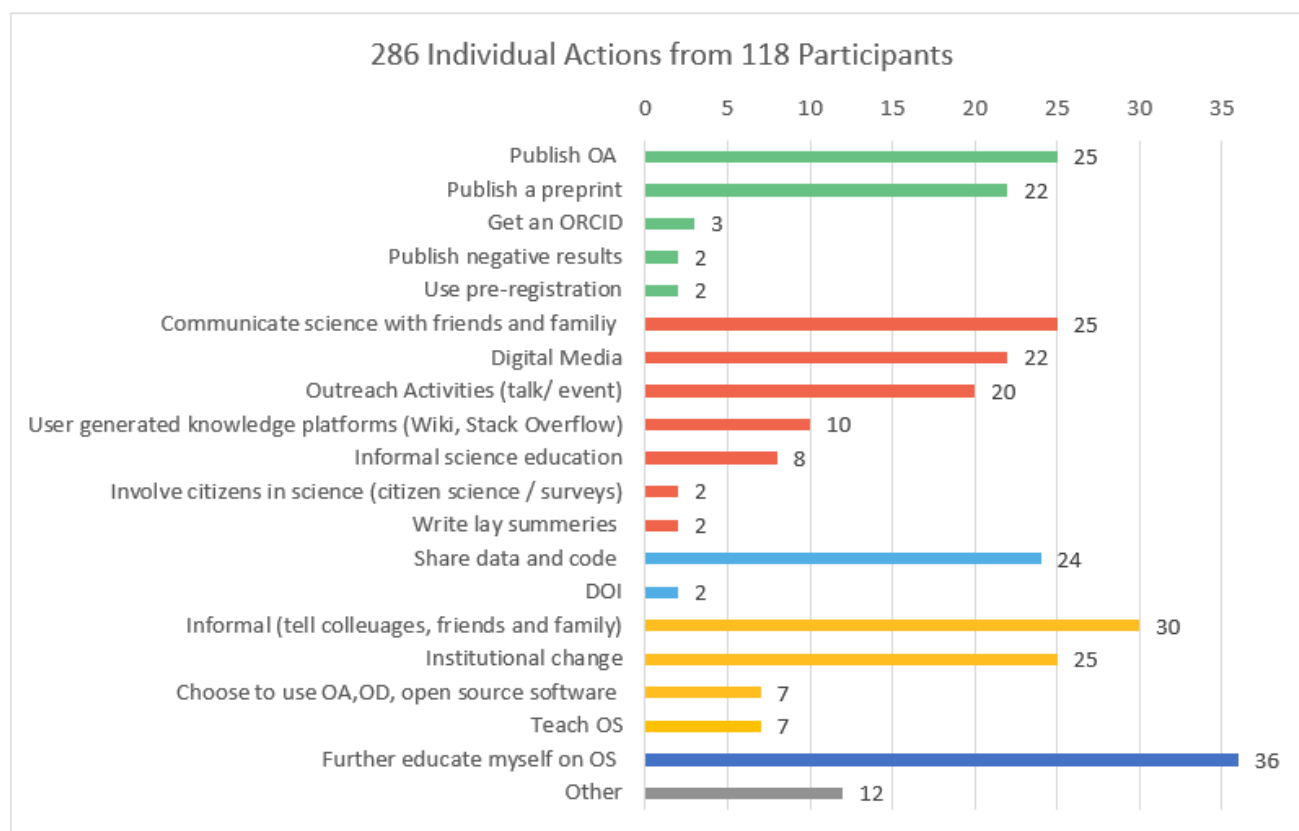


Figure 4 Overarching Areas of Individual Action Plans

We identified five different overarching areas that the IAP's can be organized by. The distribution of the IAPs is shown in Figure 4. Almost 90 individual actions have been planned in communicating science and engaging with the public. Nearly 70 actions have been planned in advocating for Open Science. For Open Access 54 actions have been planned and 26 actions have been planned to share data and code for reuse. Also, 36 individuals plan on deepening their knowledge on Open Science or one of the areas of Open Science by further educating themselves.



*Figure 5 Individual Action Plans Overview*

Figure 5 shows a more in-depth view into the specific individual actions. Overall the area of communicating science and engaging with the public seems to be the most take away action coming from participants, followed by advocating for open science. Advocating for open science entails telling colleagues about Open Science, working towards an institutional change by renegotiating publishing policies with PI's, setting up an Open Science policy or strategy for an institute, or incorporating Open Science in teaching modules. The number IAP's of Open Access which encompasses publishing a paper in an open access journal, or uploading papers to institutional and discipline related repositories or using pre-prints show that participants of ORION trainings see the need and intend to contribute to publications being accessible through Open Access. The individual action to further educate oneself in Open Science indicates that the workshops are just the beginning of understanding and practicing Open Science and also that the concept is well received, interesting and worth following up on.

There are a few areas of Open Science that seem to not be strongly incorporated in the action plans. Such as publishing negative results, writing lay summaries and involving citizens into research through citizen science, even though these topics are well discussed and addressed

within the workshops. These topics seem to be not graspable for most researches--all three topics are theoretically well received but then not something that is individually planned.

As the ORION training team delivers both workshops and sessions at conferences it is of interest to see how those formats in terms of the content received compare. By comparing the IAPs from the different formats we can conclude if the depth and range of actions differ.

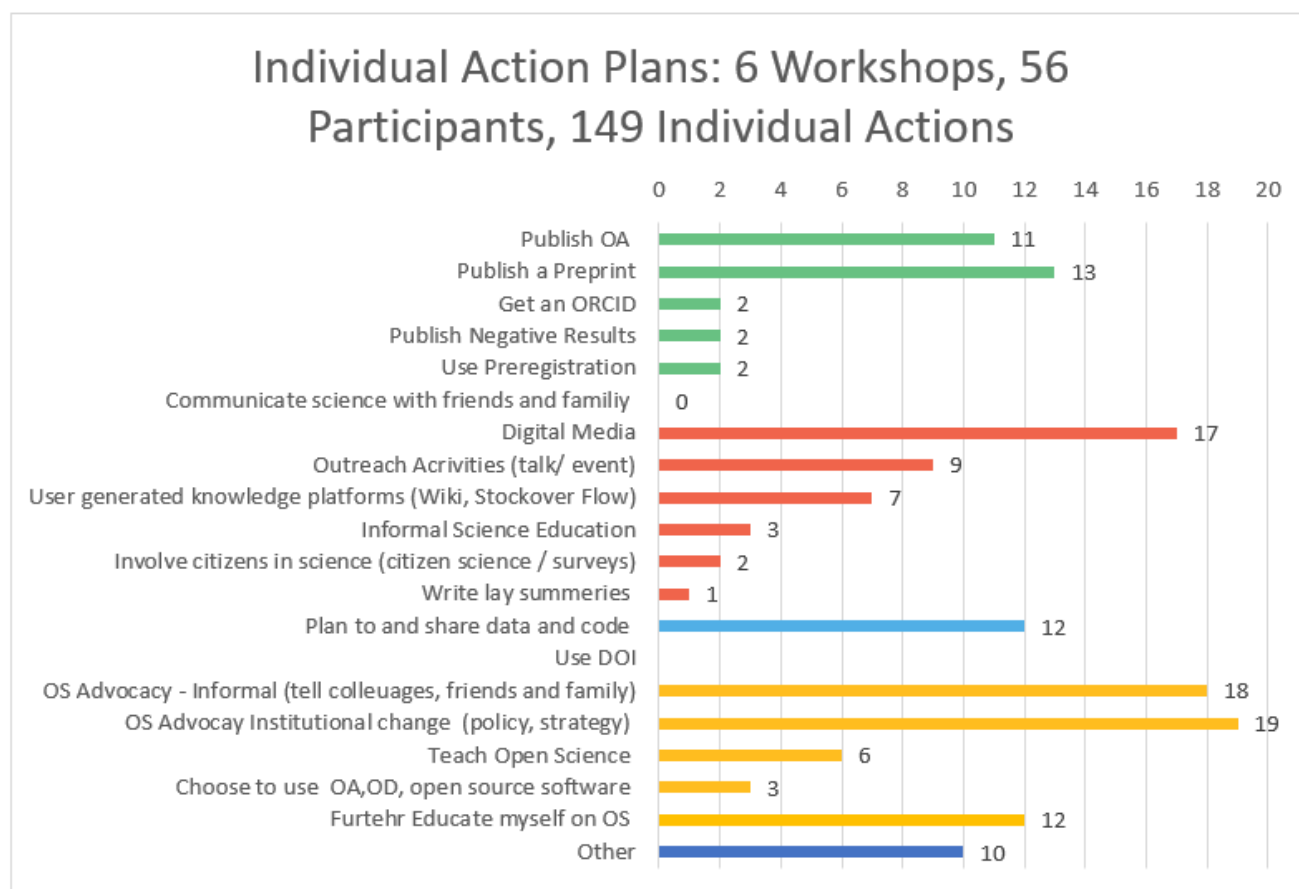


Figure 6 Individual Action Plans made in Workshops

Interestingly the individual actions planned do not differ much depending on the format of the training, which was for us a bit surprising. Figure 6 illustrates the IAP's from the full-day or half-day workshops, which encompass at least 4 hours of training. In these trainings, participants have time to do interactive activities, discuss and reflect, develop an opinion and view aspects of Open Science from different perspectives and have the opportunity of applying Open Science principles to real life situations through working with case studies. The conference sessions see Figure 7, are a full packed 2-hour interactive presentation of the key points and aspects of Open Science, designed as an introduction and overview of relevant areas of Open Science and the concept of Open Science in itself. One must note although the content is given through a presentation, questions and discussion is encouraged so that the participants can, and do, address their individual needs and thoughts.

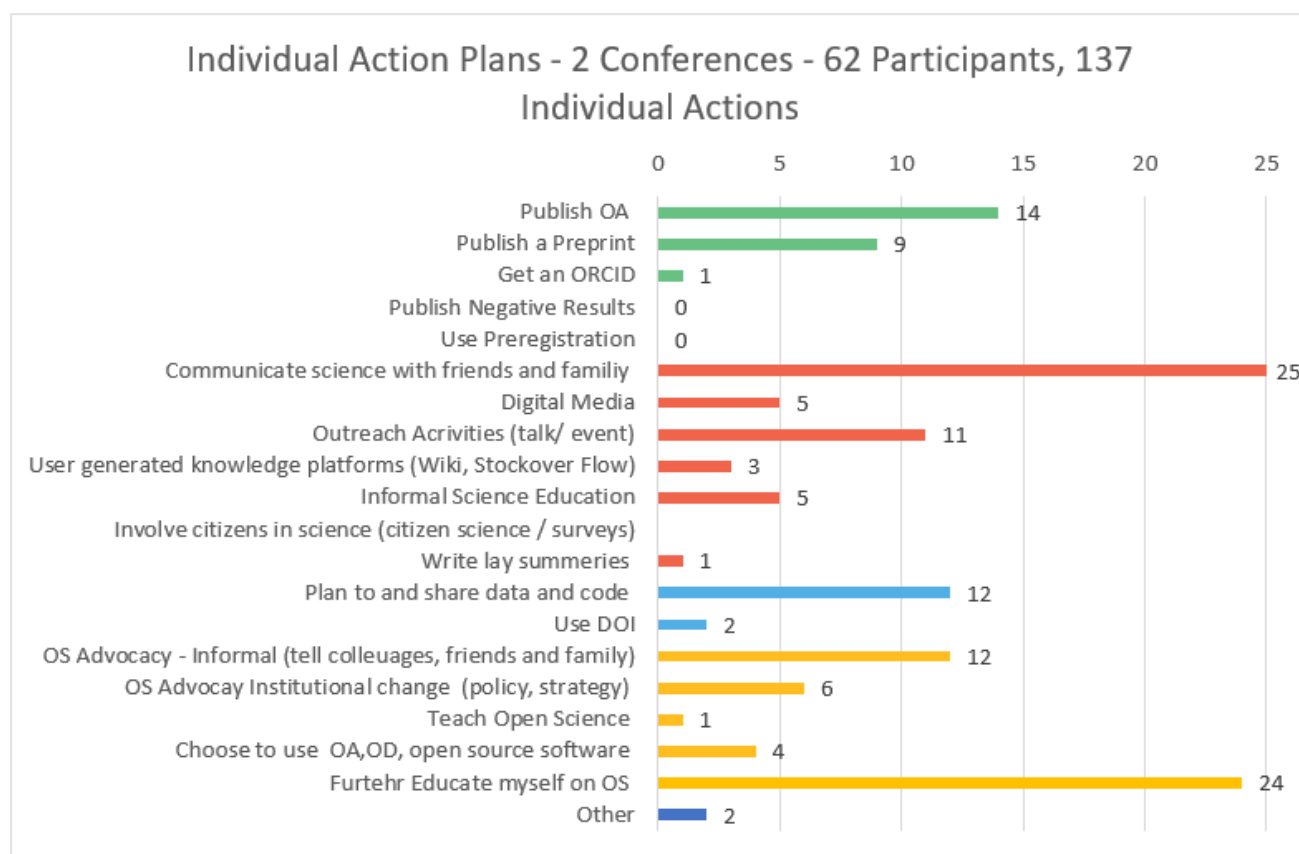


Figure 7 Individual Action Plans made in Conferences

There are however some noticeable differences between the formats, the action to further educate oneself is planned in double the amount in the conferences than it is in the workshops, meaning the time that is spent in the workshop helps to clarify the content. Also, to mention one category, to communicate science with friends and family is only found in the conferences. This is due to a discussion that happened in one of the conferences with PhD students on communicating science in general.

Members of WP4 training team assumed that the range of IPAs would be much less due to the time and activity difference between the different formats. However, this proved not to be the case comparing both of the formats with each other overall in terms of the IAPs. This lets us conclude that in view of the time restraints researchers have, 2-hour formats for the future would be completely sufficient.

## Supporting materials

Shortly after the workshop has ended the participants are emailed a pack of materials. These include: photos from the event (e.g. the brain walking flip charts), the slides to the presentation on Open Science, Open Science factsheets, an Open Science checklist to help participants think about how Open Science can be integrated in research, the set of case studies on Open Science issues. The last three of these can also be found on the ORION website, under Publications>Training Materials and are detailed below.

## Scientific Conferences

### Early Career Scientist Forum on GPCR Signal Transduction (ECSF-GPCR)

This was a scientific conference organised by Charité Universitätsmedizin Berlin, Stiftung Charité, Berlin Institute of Health (BIH), Charité Clinical Scientist Program, FMP Leibniz-Forschungsinstitut für Pharmakologie, Collaborative Research Center CRC 1078 "Protonation Dynamics in Protein Function", GRK1910 "Medical Chemistry of Selective GPCR Ligands" and Boehringer Ingelheim Pharma. The MDC team delivered a short interactive session on Open Science.

### Brain Tumor Meeting

A short workshop on Open Science delivered as part of the 10th Brain Tumor Meeting 2019 at the MDC.

### European Glial Meeting 2019 Porto

A short workshop on Open Science delivered as part of the XIV European Meeting on Glial Cells in Health and Disease (GLIA 2019) at

### Helmholtz Graduate School of the German Cancer Research Center (DKFZ) PhD Retreat

A short workshop on Open Science delivered as part of the DKFZ annual PhD retreat. By invitation of researchers in the organising committee.

### MDC Annual PhD Retreat (2018 and 2019)

There have been Open Science workshops at the MDC and FMP PhD retreat for two years running. By invitation of researchers in the organising committee.

### SignGene (Israel/Germany Research Exchange Programme) PhD Retreat and Winter School

A workshop on Science Communication and Storytelling was delivered to researchers at the SignGene Retreat. By invitation of researchers in the organising committee.

## Online Training

### Online Training Materials

In addition to the interactive training events, detailed below, the WP4 team have also produced a number of training materials that are available on the ORION website. There are fifteen one-page factsheets on various aspects of Open Science, for example Preprints, Public Engagement, or Crowdsourcing. These factsheets summarise the major concepts related to that aspect of Open Science and contain hyperlinks for further reading. There are also three case studies or scenarios on Open Science topics. In addition, there is an Open Science checklist for researchers (or funders) to consult, it contains suggestions for how Open Science practices can be incorporated at each stage of the research process.

### Overview of Optimised Online Trainings Delivered

Date(s)	Activity	Target Group	Content	Audience
28.11.2018	#ECRWednesday Webinar: Arts in	<ul style="list-style-type: none"> <li>Researchers</li> </ul>	<i>Hear about how science can be effectively communicated to a broader audience using arts.</i>	Unknown

	Science Communication			
29.11.2018	Webinar for Vitae	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	<i>Open Science: What, Why, How?</i>	25
29.11.2018	Live Twitter Open Science Q&A	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	<i>#vitaechat</i>	
31.1.2019 - ongoing	Podcast	<ul style="list-style-type: none"> <li>• Researchers</li> <li>• Project Coordinators</li> <li>• Open Science and RRI Policy Makers</li> </ul>	Different topics relating to Open Science with interviews with relevant guests	2600
3.9.2019	Live Chat Webinar	<ul style="list-style-type: none"> <li>• Funders and research managers</li> </ul>	The ORION Open Science Project and Wellcome Trust teamed up to create an interactive training event about Open Science	50
28.9.2019	MOOC Focus Group	<ul style="list-style-type: none"> <li>• Researchers</li> </ul>	MDC and FMP Researchers at the MDC PhD retreat can test and feedback on the content of the MOOC	70

## Webinar for Researchers

The webinar was done in collaboration with Vitae who support and upskill researchers. It established what Open Science is and why it is needed. There was an overview of the main areas of Open Science; Open Access, Open Data, and Public Engagement, and Data Management and IP. In addition, there was some practical tips on changes researchers can make towards Open Science, the potential career benefits of Open Science, and information on what resources the ORION project can provide. The webinar was essentially the presentation that is given at the workshops. There was time for questions from the attendees during the presentation and at the end.

## Live Twitter Chat

The ORION contributed to a live Q&A session with a panel of Open Science experts as part of the #vitaechat series.

## Podcasts

The initial gap analysis showed that there are a lot of webinars and videos on Open Science already in existence and the MDC decided that webinars alone do not have enough reach and impact. Following discussions with PhD and Postdocs on what format they would find most useful for learning about Open Science, the WP4 team decided that weekly podcasts (online pre-recorded radio-style shows) would be created. The ORION training team would act as producers, hosts, and content editors, and each week there would be different topics relating to Open Science



with interviews with relevant guests. E.g. Open Access - interview with well-known Open Access advocate Bjorn Brembs, or the founder of the browser plugin Unpaywall; reproducibility – interview with a science journalist who writes about the topic; Pre-prints – interview with PhD and Postdocs who have published via pre-prints.

### Episodes by Topic Area

#### Open Data

- Good scientists share data?
- Open Data: FAIR, foul, and meta
- Public Money? Public Code: What 'Free' Software Really Means in Research
- A Metric for Optimism: John Ioannidis on Reproducibility, Preregistration, and Data Sharing

#### Open Access

- Retraction Watch, Research Integrity, and Peer Review
- Preprints: what do scientists think?
- Plan S: Solution or Short-sightedness?
- Scaling the Paywall: How Unpaywall Improved Open Access
- Signing up to Open Science: Open Peer Review and Aligning Core Value
- 'There is no spoon': Imagining Science Without Journals
- Laying it all out: How The Science Breaker is supporting lay summaries and science communication

#### Public Engagement/Science Comm

- Communicating Animal Research: Part 1 and Part 2
- Rewriting Diversity: Editing Wikipedia and Opening Science
- Is science self-correcting?
- Open Science and Career Pathways
- An Ignoble Pursuit: Laughing and Thinking about Science Communication and the Ig Nobel Prize
- A Skeptic's Guide to Open Science: Steven Novella on tackling biases, publication noise, and pseudoscience

#### Citizen Science

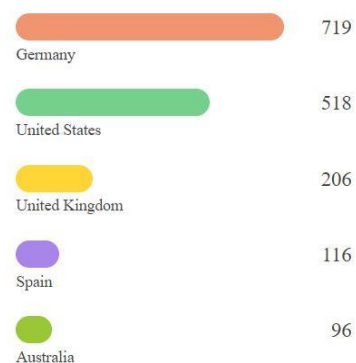
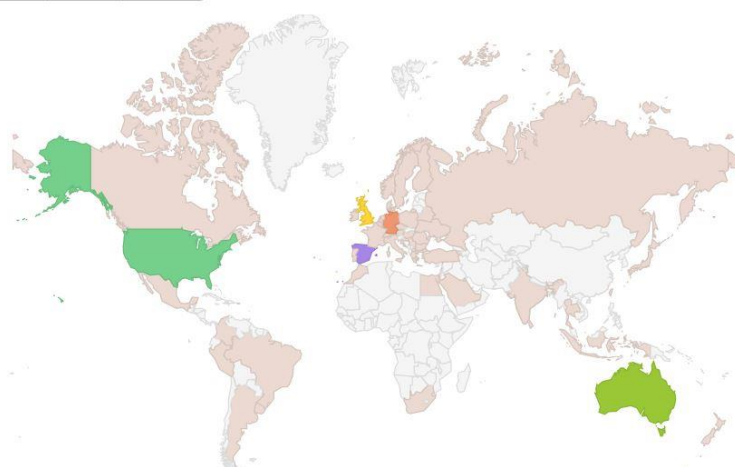
- Aubrey De Grey, Aging, and Alternative Approaches to Research

The ORION podcast was launched on 31st January 2019, and is now on its 22nd episode. It has been downloaded over 2500 times by people across the world. The podcast has reached listeners from Germany to Japan, from the UK to the US. It is broadcasted every two weeks on a Thursday morning. The Twitter account for the podcast, @OOSP\_ORIONPod, has 330 followers.



#### WHERE YOUR AUDIENCE COMES FROM

World U.S.A Canada Australia



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#### TOP 10 EPISODES

Episode	Released	Downloads
Scaling the Paywall: How Unpaywall Improved Ope...	02/14/2019	219
Open Science and Career Pathways	01/29/2019	206
Aubrey De Grey, Aging, and Alternative Approaches...	04/11/2019	204
Preprints: what do scientists think?	03/14/2019	142
'There is no spoon': Imagining Science Without Jour...	07/04/2019	138
Retraction Watch, Research Integrity, and Peer Review	04/25/2019	131
Trailer: ORION Open Science Podcast	01/29/2019	128
Open Data: FAIR, foul, and meta	05/09/2019	116
A Skeptic's Guide to Open Science: Steven Novella ...	08/01/2019	103
A Metric for Optimism: John Ioannidis on Reproduc...	07/18/2019	102

## Live Chat Webinar for Funders and Research Managers

In this 90 minute Live Chat the MDC teamed up with Dr Ann Grand who is the Senior Lead for Engaged Research and Public Engagement for the Wellcome Trust Centre for Cultures and Environments of Health to discuss topics such as, what can the people working for funding organisations do to promote Open Science and what are researchers concerns and expectations regarding Open Science and funding. Attendees could suggest a question in the registration form before the session or add one in the chat box as the chat progressed. The number of registrations was very high 107, the actual attendees were lower. approx. 30 people. A similar training may be repeated in early 2020.

The Live Chat was recorded and is available on YouTube: <https://www.youtube.com/watch?v=X9lcHnjmNxM&t=183s> and currently has over 40 views.

## MOOC

### Development

The WP4 team undertook a gap analysis and of the current Open Science materials currently available online, such as the FOSTER+ web resources, RRI Tools, and the Open Science MOOC developed by Jon Tennant. One key gap that was identified was a structured course that participants could progress through in real time, a 'live' course. Additionally, the focus of the course needed to be on interactive activities which would allow researchers to reflect on Open Science can be used as a way to effectively share research with the world and not just those in similar academic institutions.

### Partners

The WP4 team created several collaborations with other institutions, projects, and people in order to create an impactful and high quality course. The main partner was TU Dresden, specifically Sabine Barthold and Antonia Stagge, who were subcontracted to advise and assist on the technical creation of the course on the Open Learn Create platform. Barthold had previously created a shorter MOOC on Science 2.0 and Open Research Methods for the EU-funded MOVING project and so had expertise in all aspects of MOOC creation. The second partner were members of the EU-funded FAIR4Health project who created a module on FAIR and Open Data. Thirdly, Katarzyna Biernacka who is a researcher at Humboldt-Universität zu Berlin and was previously part of the project FDMentor, funded by the Federal Ministry of Education and Research (BMBF), which designed and delivered data management training, created a module on research data management.

Within the ORION consortium VA is providing ongoing support in terms of the creation of materials for the course (e.g. infographics) and promotional materials to help advertise and market the course. UAB are providing support on the surveys. The Genigma project has produced materials on Citizen Science.

### Content Feedback and Creation Meeting

There was a two-day meeting in Berlin hosted by the MDC to which all MOOC partners, relevant MDC staff, and ORION consortium members were invited. The workshop was a chance for the core MOOC team and those external to the course creation process to view the planned and existing content so as to feedback opinions and ideas on its quality and feasibility. In addition, new ideas for content were generated and outlined.

## Focus Group

Prior to running the course live it a focus group session was organised with PhD students from MDC and FMP at the annual PhD Retreat, similar to the pilot workshops for the offline training. The retreat attendees were divided into groups of 4, each group had two laptops. The participants then had the opportunity to go through one module of the MOOC, interacting with the content directly. They then had to complete an online feedback form which asked them to assess the flow, usability, and relevance the module.

This data was then analysed to identify any problems or areas for improvement. From this feedback we realised we needed to increase the amount of interactive 'fun' elements, such as the Which Open Science Animal Are You? Quiz and also ensure the content was sufficiently in-depth and practical, researchers said in the feedback that they wanted practical resources.

## Content

The content of the MOOC follows a module structure:

- Landing Page: Introduction, Guidelines, and Pre-survey
- Module 1: Open Access P1
- Module 2: Open Access P2
- Module 3: Data Management
- Module 4: FAIR and Open Data
- Module 5: Sci Comm and Public Engagement
- Module 6: Reflection and Action

Each module runs for a week and requires approx. 90 mins to 120 mins of time to complete. The participants can complete the module anytime within that week (i.e. Participant 1 can do the module on Monday morning, Participant 2 can do the module on Sunday evening, or any variation in between).

To ensure active engagement participants are required to complete at least 70% of the course across all six modules. Some of the module activities will include using the forum. Participants are actively encouraged to share ideas, experiences, and questions on the forum, and to respond to those of other participants. The course moderators will monitor the forum to ensure questions are answered quickly, but peer-to-peer learning is the main focus of the forum. The MOOC also has a blog, which functions as a similar way to a normal blog or wiki. It allows a group of people to enter and communally edit bits of text. Many activities will require you to add links and text to the blog, the result of this will be a living document that will contain useful Open Science materials for future course participants and other researchers.

The course also includes interactive videos which use H5P in order to make the learning experience as active as possible. There are also clips from the podcast, quizzes, factsheets, infographics, and presentations.

## Schedule

The course will run for 6 weeks between 21st October - 29th November 2019.

## Actions Planned

There are upcoming training workshops planned both in ORION partner institutions and in other institutions across Europe. In October, there will be two researcher training workshops in the UK, one in BI and one for the University of Cambridge. There will also be researcher training workshops in Sweden and Denmark. There may also be one in Italy. There is also a workshop on Open Science planned for Berlin Science Week in November 2019.



All current and planned workshops are listed and updated on the dedicated training page on the ORION website: <https://www.orion-openscience.eu/activities/training>

## Dissemination and Sustainability

The training events are disseminated in collaboration with WP6. For each workshop an individual PDF flyer is produced which can be used by the host institute to promote the event. In addition, WP6 produce an event summary and add the workshop to the calendar on the ORION website. The workshop is also promoted via social media, specifically Twitter and Facebook. Photos from the workshop are also often posted during or after the event on Twitter. After the workshop the participants receive an email with supporting materials and the feedback survey.

The format of the offline training will form the basis of what is taught at the Train-the-trainer event. Many of the online materials, such as the supporting materials, podcasts, and recordings of webinars, will be available after the end of the project. Work will begin on adapting the MOOC from a live format to a self-paced one in mid-2020.

## Conclusions

The WP4 optimised training have a clear format which can be adapted to specific institutional needs and a range of timings (full day, half day, and seminar session). There has been a good balance between developing trainings for researchers and funders, and offline and online trainings. The WP4 team are confident that the remaining work will be completed successfully and that the WP will produce materials that will live-on after the project and remain useful to stakeholders.

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Last updated: 30.9.2019*