

What is open science ?

Open science is a new way of doing research enabled by digital technology, and may be applied to all stages in the scientific process, be it findings, tools, or research methods.

By enabling unhindered access to the results of academic research, open science seeks to:

- democratise access to knowledge
- enhance research effectiveness, by ensuring data is findable, accessible, interoperable, and reusable (the [FAIR principles](#))
- improve the quality of research by making science more cumulative, more strongly backed by data, and more transparent

The idea of open science covers a broad area, running from the data used or produced through to assessing publications. It seeks to encourage scientific advances, innovation, and progress, and to increase citizens' trust in science. It represents a stride forward for both science and society, but thereby requiring a deep change in scientific culture worldwide, a shift from competition towards cooperation, from possession to sharing. It represents a new way of doing research, which applies to all stages in the research process, including findings, tools, and methods. For researchers, open science thus implies a real change in their professional practice.

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[See transcription of video](#)

welcome everybody we have 93 participants which is really nice i'm milan insect from charles university and i will be presenting on this session of this open science on this webinar along with johan apple from university heidelberg and richard denis from university of copenhagen first you'd like to say something about fourier plus alliance which was the basis for this cooperation in which we created or prepared this webinar and the others that will follow so you can know for a plus transnational strategic university association uh it's cooperation of six universities charles university heidelberg university sorbonne university university of copenhagen university of milan and university of warsaw there are different things going on in this alliance but one of them is that we work together on promoting open science and we found out that 4u plus is a very interesting platform for for this because we have very similar similar goals we all work with open science topics it's similar but yet everybody do it in their own way so we decided to make it more to get equal equal open sign support on different universities and we also decided to prepare this series of webinars which are taking part in the first one and we will see that uh this cooperation will be very helpful for everybody today we will talk about open science in a very generic way we will talk about a bit about open science and the scientific method about open access and future scholarly publishing uh then a little bit about fair data principles which are important as well we will mention educations and skill research integrity uh new topic european open science cloud which will be important in future years and we will also touch another new and interesting topic which is citizen science now i would like to hand over the floor to johan upton we will say we will tell you more about scholarship yeah hello everybody a very warm welcome also from my side it's great to have you all here and to see so many people interested in op science topics and i start this course today with a with a little introduction and i want to start with a short disclaimer right from the beginning so of course not only um in the title of this seminar what is open science but in the title of the overall training session series we set up here within our project um you always find the title or the word open science but of course um we just want to make clear right from the beginning that we won't talk about um science in the narrow sense that science meaning the natural sciences and life sciences here but we are talking about all kinds and all fields of research so um maybe open scholarship or open research would have been the better term actually because it's also about open research practices in in the arts and humanities or in the social sciences nevertheless of course open science is the term which is frequently used in all these kind of discussions be it uh on on science methodology also science policy making and so we'll stick to open science for the rest of the course but please be aware that it's about all fields of academic research um yeah and just for the start i want to want to invite you a bit to think for for just a couple of seconds about your particular field of research so there are a lot of people have signed up from all different kinds of disciplines for this so we have people with backgrounds and in art history for example on economics in cancer research and theoretical physics and of course all the research you do in your your particular field there are these kind of research activities they might differ in very very many ways but nevertheless you can think for a couple of minutes about what it means for for your research or how your research or research in your field can be carried out in a way and that its results are reliable transparent and comprehensible it is understandable and accessible to to other people um how can research be carried out in your field that there's confidence in its in its results and how can research be performed that new insights can be found and that these kind of scientific progress takes place as quickly as possible and as i said since all of you come from so many different disciplines um i'm pretty sure that the answers you might give my might also differ from each other but i would bet i mean as a librarian um you you don't earn so much money but i would put a lot of money on that if you would write down the answers you would give to these particular kind of questions the term openness will be somehow be part of the answers you would give to these uh questions post on the slide before so um you could think a bit about why this is the case and i won't do that on the next slides and i think that is the case because the idea of openness is very closely tied um to the scientific method and to the to the way research is carried out and you can illustrate this by looking into onto different philosophers and also other theorists of science and i will try to do it today with the aid of um kyle popper emily and kyle popper and some of his very basic ideas of what [Music] what constitutes science and what constitutes a scientific method and yeah papa has it uh besides all of the ideas you you all know about his ideas about falsificationism and all this kind of stuff that um science um is in particular science is public in nature or as a social enterprise so one of papa's main points in his philosophy of science that is that research is nothing individuals can do but science or research is always some kind of social activity and why is that okay or according to papa that is the case because only in this social setting or as a social enterprise only if science is carried out in that way something like scientific objectivity can emerge whatever objectivity of course might mean and that is the case because individual researchers they and that's the way papa puts it individual researchers are in love with their particular models with their methods with their theories that they will stick to them with all of their strange and that is why in order to have scientific processes you need some kind of public control and criticism and by third parties this is a necessary condition for something to qualify um as scientific um and because this that is so important proper hazard that you need to have institutions which make this kind of criticism possible and according to proper and these kind of institutions are laboratories and journals and uh scientific conquests so where you put your where you can come and put your hypotheses on the table and present your arguments to your scientific communities and to your scientific peers and get criticized by them and then and that leads us to the topic of open science the main question behind for me the main question of open science edits as it is discussed today is how do these kind of institutions uh also pop up mansions change over time and in particular how do these kind of institutions and this may sound a little simplistic but i think it's the right way to post the question how do these institutions change if you have the internet if you have something like the internet available to you how should you perform um research with this kind of medium at hand and that really leads you to the idea that open science is not something which is which is a new new thing coming up now but it's really something it's just taking the idea of what constitutes the scientific method or scientific methods seriously um given the internet so open science is just science done right with the means of electronic publishing data sharing and all these kind of possibilities which emerge if you have new digital technologies at hand um yeah so what is open science about open science is about uh opening up scientific processes and products and from all levels of the scientific process to everyone so it's about open access that's the most yeah maybe the most prominent discussion so here it is about the scientific publications and why they are behind paywalls and whether it could be done otherwise it's about open research data it's of course about also research software open source code it's about open methodology which can mean different things like opening up your electronic lab notebooks for example also for third parties also if you are from medicine the idea of pre-registration of clinical trials is some kind of open methodology element within the science process it's about open evaluation practices like having um open metrics for example for bibliometric analysis or having something like open peer review it's about also getting citizens involved in research processes so we will hear about that also later during the presentation so it's about citizen science and i also put open licenses here on the slide because open science also has a crucial legal dimension on any case so it's about the reuse of scientific materials and therefore it's also about proper licensing of research products be data or source code or publications so and doing this introduction here milan richard and i we will touch upon some of these aspects and then um of course we have 13 follow-up sessions in in this training session series and so you can learn about all these aspects of open science in more detail um doing doing

our our series of open science seminars so this today will really be just be not more than than a teaser or something and to make you some appetite for more so um op science of course you could discuss in many areas in scientific communities in in policy papers and we decided to use this science policy paper by leo the league of european research universities to provide the structure for our presentation today so this leo paper um identifies eight dimensions of open science which are listed here on the slide and we just pick on uh on five or six of them today to give you some idea of what open science is all about um so i will start to talk a bit about the future of scholarly publishing in the beginning and then after that richard will go on and tell us a bit more about the fair data principles so if you want to talk about the future of scholarly publishing you must go a bit to the past of scholarly publishing to to the early 2000 years yeah and that is when uh the discussions about open access to scholarly publications uh really became prominent and this uh kind of publication model really became really became a thing apart from particle physics where open access has been a thing since the early 1990s um and from that time or from that time you have various um important declarations and definitions of open access and i choose to point you to the berlin declaration on open access today and because it really has some important points in it related to the overall discussion on open science so when you want to read what is open access according to the berlin declaration you find open access contributions include original scientific research resource but not only these but also raw data metadata source materials digital representations of picto pictorial or graphical materials and scholarly multimedia material the authors and right holders of such contributions grant to all users a free irrevocable worldwide right of axis 2 and the license to copy use distribute transmit and display the work publicly and to make and distribute derivative works in any digital medium for any responsible purpose subject to proper attribution and authorship and these really are the two important aspects of open science overall fields where you can find the discussion it's about free access to products of scientific activity but it's not only about this but it's always about more than this it's always about reuse and that is why the legal dimension is so important people shall not only be able to look at your data but they shall be able to take your data and use them and make something new out of it or to check whether you did your research sound now talking about open access in particular um it means lifting the the paywall behind which most of the scholarly publications are hidden or also today this this is still the case so but so it's about thinking about how can i make my publications open access and most of you might be aware that there are different ways of how you can publish your research open access of um often these uh ways are framed by the terms the golden road and the green road to open access so the golden world basically means the primary publication is released on open access so the publishers version you can find on the publisher's website for example is openly available to anyone the queen wrote mean that preprints or post prints are made openly available via suitable repository services so with regard to queen of max's you might be aware of um of the very popular pre-print so it's called the archive it's it comes from originally from particle physics and it's a pre-print server which is very frequently used for all researchers in the field of physics but also mathematics or information science computer science and stuff like that so really it's the standard mode of publication if you if you are a particle physicist or physicist so in particle physics i don't know 99 of all papers are available um open access via this archive services but there are also different kind of services so if you are for movies and also this has some uptake in other disciplines so disciplines like um biology or medicine are also starting to have these kind of pre-print servers so the bio archive for example in for biology um but they are also of course disciplines which don't have this discipline specific services around but there might be other kind of services so for example if if you are from france from the support for example um you might know about the hal repository which is a national open access repository available to researchers from french higher education institutions regard to gold open access the main discussions today which are really important to shape the future of scholarly publications are about business models they are about the question how to finance the publishing infrastructure we need because obviously publishing open access is not is also associated with some kind of course and you need some kind of business model and how these costs are covered and so the most prominent business model here is of course pa having publishing fees so having article processing charges or book processing charges but it's also about for example having huge agreements with publishing houses so-called transformative agreements which tried to shift the subscription budgets of the library libraries to central open access budgets and there is a lot of discussion going on at the moment about this kind of transformative agreements and how these should be spelled out and whether it is a good idea to have them or whether they will perpetuate some kind of the problems we have with the um academic publishing market and so if you're interested in this i really can recommend to to join the follow-up webinars on on these kind of topics already the second one will touch upon all these kind of discussions related to this there are other business models around as well for example membership models or some kind of pledging or crowdfunding models um and of course we also have non-profit publishing infrastructures in this field in particular we have non-profit open access university presses so your universities also start to provide infrastructures for electronic publishing and open access to to you and to other research communities and so this is really a short um short thing we would really recommend or recommendation that you go to your particular university and to the website of your your universities and your local libraries to check which kind of infrastructures and support frameworks they have for these kind of things so for example i took three queen screenshots here on the left side you see a screenshot from charles universities they have several agreements with commercial publishers in place where you can get discounts on these kind of publishing fees for your open access publications in the middle there's something from from copenhagen so in denmark there's a national agreement with the large publishing house elsevier where um which covers all danish at least as far as i understand it all danish publications with elsevier and they are put to the open access automatically and the costs are covered by this general framework agreement and on the right side you find something from milan they have an open access publishing fund and if you have to pay a publishing fee you can you can make an application there that the costs are covered centrally and of course these are only examples we have such kind of publishing fund also in heidelberg in place and um the same might be true for for the other universities where you are from so check your local websites and you you will find stuff there and also check your uh local institutions whether they have their own open access publishing platform so for example milan has an oh very elaborate open access publishing house they are publishing around 50 open access journals for example and we are also doing that in heidelberg and we have an in heidelberg university publishing which is an open access university press publishing publishing journals and monographs in the open access model and this is here also just a short teaser or short example to show to show you what we are trying to do here because um since you remember this section um was titled the future of scholarly publishing and i was i am still talking about open access which is um discussed since 20 years or so now and what we really try to do with heidelberg university publishing is that we also try to produce enhanced publications in our open access publishing house not only um pdf files which which imitate print books and these pdf files are then available open access but we really try to make use of the possibilities the electronic medium brings with it so we try to integrate videos or animations or other multimedia assets into our applications we try to apply for example controlled vocabularies or other ontologies directly to our publications or we try to link publications directly with the underlying research data to produce publications which are more than imitations of printed books because if we talk about the future of scholarly publication that is really the way i think it should go and just to finish this section um i said discussions about opmex are going on for 20 years or so now but it really now is the case at least for germany if you look to german journal articles published from from german authors it is the case that more than 50 or maybe more than 60 of these articles are available in open access right now so it is really it is the case now that open access is on its way to become the dominant publishing model at least for research articles and that brings us to the question that when it goes to the future of scholarly publishing it is not the question any longer whether we want or we will publish open access or not this case is already decided so the future of scholarly publishing will be open access publishing but the question is really how this opex landscape will look like and how we want to shape it and that is something which is really an interesting field of discussion and something and if you also think it's interesting you really should sign up for for the next seminars too and and that was the part on publishing but of course there's no publishing without underlying research data and that's why i hand over to to richard now and richard will tell us something about the fair data principles and how they fit into the open access landscape thank you because uh can everybody see my screen that's good hi i'm richard dennis and i'm here representing the university of copenhagen and my topic is to wet your appetite on a very important component a very important pillar very important dimension of open science and that being the fair data principles i am uh not going to go so deep in the fair data principles but i encourage you to after you have heard a little bit about the fear data principles to sign up for our research data management dmp uh course on on fair data and fair data principles and data management plans so this is uh this is what all of you can expect as you embark on your your new role as potential phd students potential researchers potential people interested in and research as it relates to uh research data management here a little graphic to discuss with you um what the fair data principles are and the new policies as it relates can i can you attend this uh seminar uh no sorry we have a new policy uh you first need to uh donate your your data so it can be open uh and uh and of course there's a box there relating to uh open data uh as uh as as my colleague joachim has uh has been discussing open access is a way to make scholarly publications uh and data and data sets open available to the public for for scrutiny and verification likewise is the same as it relates to open data and as you can see there to the right there is the research data management workflow cycle and two very important components of the research uh data management workflow cycle is the reusability of data and the ability to share data i won't focus so much on the other uh items in the workforce cycle but when it comes to the ability to make your data available to be shared and your data to be used you'll find that the fair data principles are very very important components to that so what is the fair data principles uh very intelligent men unlike myself in 2016 uh came up with what we call now as the fair guiding principles for scientific data management and stewardship as my colleague has said yokom it just doesn't uh pertain to uh to scientific data management it pertains to all domains within within research but for this terminology i have used the principle for scientific data management this was published uh in the scientific and scientific data magazine or journal and since then they have they have gone and become the important touchstone for long-term data management of research data of all kinds the fair authors intended to provide guidelines to improve the finability the accessibility the inoperability and reusability of digital assets digital assets can include anything that has has either transformed into digital objects or is digitally born these principles emphasize

machine actionability for example the ability to automate computational systems to find access and operate and reuse data with minimal or no human intervention as humans increasingly rely on computational means and computational means could be simply google search um and means discovery to work with data as a result of the increased volume and complexity and creation speed of data so these fair data principles are broken into four components with 15 uh facets and i'll speak a little bit briefly on what the facets are but for the f which is findability uh data management uh and data produced uh enriched needs to be enriched with metadata uh assigned with a unique identifier and a unique identifier could be uh a pid a pid which is a doi um which which will allow your data to be found uh through a a unique nomenclature which is a doi number or universe uniform research indicator the a accessible which is the accessibility uh data and metadata stored in a trusted repository with open and free protocols accessible by machines and humans the eye relates to the interoperability and inoperability meaning using vocabularies and public domain ontologies uh that describe the metadata which can be referenced and that can be linked and the r which uh stands for the reusability or to be reused additional documentation and protocols describing the acquisition of the data license with detailed provenance so that in the event that you want to re once you reuse this data certain licenses are used certain licenses are available which gives you the permission to reuse the the data and the data sets that was published and produced by the the researcher as i said there is uh there are 15 different assets as it relates to the fair data principle uh the uh the f uh with the four assets uh to be findable means metadata is assigned a global unique uh an eternal uh persistent identifier the f2 data it's described which rich metadata and the f3 metadata is assigned is registered in indexed or indexed in a searchable resource and the f4 metadata specifies the data identifier this is the this is the first uh letter in the fair data principle in order for data to be accessible in va metadata is retrievable by the identifier using the standard standardized communication protocol uh the 8.11 protocol is open free and universally implementable uh and the a1.2 the protocol allows for authentication and authorization procedures where necessary and the a2 metadata is accessible even when the data is no longer available and the eye for making your data inoperable describes what format how is accessible how it's shared and broadly using applicable language for novice representation uh the i2 in this facet uh uses metadata uses vocabularies that follow the fair principles and the i3 uses data includes qualify references and other metadata and then lastly the r which is the reusability of the data metadata has the plurality of accurate and relevant attributes and the r point one releases with its release with clear and accessible data use language and the r three one point one i'm sorry one point one two uh metadata is associated with their provenance thereby being the licensing uh allowing you to use and reuse the data and the uh the r 1.3 it meets the the main relevant community standards for instance each domain may have different vocabularies that relate to that domain so you're going to be using the ontology you're going to be using the domain specific community guidelines and standards which for which will allow you to describe uh the data which will allow the data to be found and thereby be reused again this is a very uh top level high level thirty 000 feet uh description of uh the fair data principles as it relates to uh creating data or creating principles around your data and data sets uh uh there'll be it'll be morally just more described at the later um uh workshops that will be held there are there are uh four things to keep in mind to properly understand fair fair data into the fair data principles one both humans and machines are attended as digesters of data what does that mean that means this that this will lead to the creation of an ecosystem that is fast to respond to the changes uh automatically adapts to the new findings or changes the internet fair data and services this is the reason for focusing on standards for data identification mechanisms and data availability the next point is that the fair data principles apply to both data and metadata where metadata is described of records about data this is why the terms metadata is stated in the principles the third principle uh it's not necessary does not necessarily mean that data is open you can work in the in a fair manner with data that is not intended for public availability meaning that you can create your data using the fair data principles but this and there's just necessarily that your data is going to be open available to the public the last thing to keep in mind is the fair uh principles are not rules and they are not standards the fair data the fair principles must not be staked for rules or standards that you can use to evaluate tools data policies this would soon make the principles out of date inaccurate should we adopt this as losing standards adopting uh the fair principles will often be gradual adopted over a period of time uh through your work routine and through knowledge getting into gaining knowledge of what the fair daily principles are but it can also be a huge leap where you replace one typical infrastructure with another uh will often take different research areas and research communities to make the fair principles work for their respective communities here's a little graph that kind of kind of gives you a graphical representation of of the fair principles as it relates to f a i r findable accessible interoperable and reusable as you can see here in the f findable means would mean that you have to have a persistent like a d um uh in order to be found you would have to have rich metadata uh also the index uh data in the rep the the data that's being deposited in repository would need to be indexed and the pids that describe your metadata which links up to your data and data sets would have to be persistent uh the accessible the accessibility um in order for it to be accessed for future generations you'll be using what would be commonly called standard protocols open free protocols not proprietary standard protocols but open free accessible protocols and when necessary authentication and lastly for the accessibility metadata was always available and for inoperability meaning the ability to see whether or not this works uh for the data in which you are looking for and the fact that you could be using certain standards uh whether it's a csv or versus a proprietary standard like uh maybe spss or something uh you'd be using standard communications um sorry you'd be using standard vocabularies uh and the vocabularies that you'd be using would be considered to be fair uh following the fair data principle and the fact that this data in the metadata would be linked in an open data process uh and the reusability uh the metadata here uses multiple attributes um also usage licensing creative common license provenance meaning you know exactly how the data was acquired in uh in the process by which you analyze the data that information should be made available and utilizing certain domain community standards so and uh and sort of in summary uh uh in order to utilize the fair data principles uh to make sure that your data is fair uh you can see that if you're uh published your data is is published searchable information online uh link insight your publish data sets uh manage across through manage manage access to file uh in in the published data sets define the rights for reuse of your data and describe your research data and and to use open file formats so why is this important uh why it's important to use uh fair the fair data principles uh it has been discovered through uh through collins that researchers who have used the fair daily principles of their publication their outreach and the impact um [Music] has uh for example has [Music] the data has received more citation per the spark european rep report and moreover fair fair practices have also have had a high economic return in the long term and open the door for citizen science when increasingly important policy objectives and the last thing i'd like to say is as a policy weight forward is uh as it relates to the fair data principle is the data and data sets should be open as possible and close only when necessary thank you so if you will stop sharing the screen i will take sharing myself and thank you from here so we have talked a bit about publications and we have talked about data and now let's talk about people which is another important part because [Music] people are important of course as well in this and it's everybody should be minded that it's not really just about the results but it's about the process as well and you can't really have open uh research open publications open data without people who will be able and willing to to prepare them generally you can say that really the researchers hold the key to opening the research so no one else can really take this key from them and do it for them so they need to have some educations and skills because as you can see mentioned here open science brings new opportunities but also some challenges you can divide these skills probably into two groups you can acquire new skills yourself as a researcher or you can get support from your university uh it really depends on the on your own view but probably the right solution would be a combination of these two if you think about open science skills we can see four main groups there are some skills related to open access publishing there are some skills related to data management and opening the data there are other skills enabling professional research conduct which is also part of this problematics and there are some skills related to citizen science which is new emerging topics in this area if you just think about what are the skills needed for or related to open access publishing people should know where to publish to to decide which journal is is good which really is very very bad people should know how to auto archive because there are some there is some potential archiving which should be really used uh they should think about how to improve social social impact because they are not doing just research for themselves they would like to make some impact contracts with publishers is important topic as well because uh people are sometimes sometimes willing to to give so many to the publishers for free and it's very difficult too hard to to work with this problematic after some contract is signed people should keep in mind that there are some new publishing methods as well you can hear about preparing and some specific services for example from european union when you can publish on this platform and just go around the systems with journal journals all together licensing and copyright is something that's again it's maybe complicated too big but it's important because when you have something that has some value licensing and copyright is it's important to do it right not only to not like for making money from it but not to get the rights taken away from you as an author and the blue metrics and research impact reporting it's interesting for people as well because they may be evaluated based on bibliometrics and the current current ways of research impact evaluation yeah they need some change and they probably will be changed changed a bit with regard to open science and again we will have different different session for this it was the first part the second part uh skills related to data management you could imagine probably that there are many quite difficult topics to to grasp uh since we were listening to part about fair data so you can expect to the people should know something about domain specific formats standards and tools they should know what's used in their domain and what are the right way how to do things in their domain data management is important as well this includes planning because when you plan your research and you plan your work with the data you can really get closer to having fair data in the end interesting and very much requested is also data analysis uh when people would like to analyze their data correctly and get as much much from them as they could and from this open science perspective it also includes some potential for reproducibility because yeah i will tell you about reproducibility in few minutes there is some they needed to describe the data metadata with metadata so so this data will be findable according to fair and it's again something that people should know how to do and [Music] people should also know about institution specific workload workflows if there are any it's very important in some domains again with uh specifically with data protection or personal data uh there may be some policies which uh the institution would like to have uh data

provided as open as possible as closed as necessary and people who work with the data should have some idea that this is really in place and data citation impact yeah it's not really the most important thing now to have data citations but especially for example in our university data citation isn't the thing yet but it will be and you should have the data prepared in a way that they will be citable it relates to this usage of identifiers so from the skills enabling professional research conduct there should be some skills about research management itself how to manage everything in the course of your project again there are some legal skills needed when you work with licensing you work with some intellectual property both as users and as creators it's again in something some in some domain it's very very complicated how to get really for example data from some sources and there are some legal skills needed for this as well and research integrity and ethical skills uh that should be very same for every researcher you probably have seen all of us some some some cases of plagiarism or maybe plagiarism or it can become a topic of discussion that probably nobody wants sensitive data management is also important in this case because you don't want to be the source of stolen private data about somebody and this is again all these all these areas and it needs to be like kept in mind uh and last note i have here is the most most cases when there are some problems with research integrity are cases of neglect rather than fabrication but still you should be ready to avoid these as possible as much as possible as soon as possible then we mentioned citizen science and it will be mentioned later by by richard but there are some specific skills you need there as well there is research design [Music] because the data's involvement of citizens makes things very very different and you also need to engage with the people who are cooperating with you and you need to do some communication and there is uh importance of building relationships and trust uh but it's expected that a better or higher involvement of uh people should improve generally improve trust in the sides when they have some chance to work work a bit closer to scientists well this was a really extensive list and a lot of things to do i think it's important to mention that you can't really expect that everyone will be expert on everything so there is this part i mentioned in the beginning when you have some skills that you should learn to do some things yourselves but there are also should be uh some support from from the uh universities or your institutions where you work so it's more about cooperation and just learning everything but you still need to know uh or be aware that there are some requirements and you should think about it and if you need some help you should find someone someone who can help you with in these rls it doesn't automatically mean that especially with these new topics that every university will have everything in place uh but even if they don't it's nice to or important to have that there is some some problem that should be solved by the institution and it really shouldn't be everything put on the on the researcher because yeah everyone can be expected on everything so what to do be aware of new requirements check support provided by our university and be ready to undertake training in some areas because as i mentioned before uh it on the other hand it's not possible that some support will solve everything with your research there will still be still there'll be a part that you will have to do by yourself in in regard of opening or open science programmatics so next part is research integrity which is my as well we have four principles of research into research integrity reliability honesty respect and accountability uh i think from my point of view that open sides or all these openness is very strongly related to first to reliability and honesty honestly when you are ensuring the quality of research and it's reflected in the metrology analysis and use of the resources and honesty is well if you open everything and everybody can check what what the what you are doing even years after you you finished it it should really improve both reliability of your results and honesty in science in general the other parts are somehow connected as well i would say but but i see the strongest connection here in the first two there's the question if there is a reproducibility crisis it depends on the domains again but the discussion which is going on is if how large part of uh research output is not really reproducible in our many studies in recent years in different areas which are looking into that uh interesting question in with regard to open data is if the data for this research are available or if they even do exist it's something that that should be this problem should be gone if really everybody would switch to producing fair data and and working in a way that their research would be reproducible you may know there is this in journals of old i would say there was this uh sentence that data would be made available upon request it may be difficult to give somebody data upon request because people in the teams are changing and if you are not really ready to do that it may end up to be very difficult thing to do and uh on the other hand if you are creating data which are trying to follow fair principles you don't really have to put much more effort to sharing your old data because if they are fair two years ago they still have some descriptions in them they are structured for publishing and it was they were created in a way that it really helps this reproducibility so that the fair should help with with this as well and there may be other other problems with two complex experimental designs for example which are difficult to create or some human related reasons somebody makes some mistakes or maybe some malicious it's difficult sometimes to really set the one from each other so and you probably would like to avoid this as well to be just that somebody would think that you are doing something uh something something wrong and if we look on reproducibility and open science uh so the open science provides these things sharing of methodology and sharing of data we didn't mention really sharing of methodology but it's different part of open science this reproducibility part sharing research software which you used for for your work is important as well there will be session on this this as well in our webinar series licensing is important the things should be available as openly as possible so again reproducibility should be held by this uh regarding publication there should be some open peer review process so this thing will be more transparent and there should be some some rewards and rewards and incentives regarding creating reproducible research and testing reproducibility of existing research this is another quite a big topic because somebody would have to modify reward rewards and incentives and it will take some time but even even research that is created right now maybe in the future evaluated by this new criteria so it's not really too early to start with this if we see now some requirements from european union in in project projects they are asking about like following open science uh in the previous uh previous projects so um it's not really clear how in in all cases how these rewards and insectives incentives would like but it's still something that should people keep in mind and be ready for for the future evaluation so and that's generally the final part of this uh this reproducibility part you should keep research integrity and reproducibility in your mind when you are conducting your research and you should try to create and provide fair data the thing is that once you put something out there it can and if you wouldn't do things correctly and or you would you may cause a problem for yourself for your future self because these things are very difficult to fix later and uh so you should really keep researching the retain in mind all the time now we can go to two different parts which is european open science cloud and richard will again take the floor and tell you more about this topic hi again uh the my i'm gonna talk up uh in this in this section about two things uh the european open science cloud uh and citizen science and the european open science cloud is is a it's a very ambitious uh undertaking by the eu and what they are attempting to do is to take all of uh of the uh communities and the communities are too too very to to discuss but to is the ideal is to take all the communities and to create this uh federated solution uh and so it is say uh it is a um it is a urban commission initiative aim at developing a federated infrastructure for providing its users with services that is designed to promote open science practices its aim to develop a trusted virtual federated environment that cuts across borders and what i mean by borders it means from country to country and scientific disciplines and that that means non-scientific uh disciplines humanities uh the threatened whites the threat the the wet and dry sciences uh so scientific disciplines to store share process and reuse research digital objects like publications data and software following the fair data principles and that's the core of what the uh the uh oscar the european open science club is it is about allowing um all of the research objects following creating the ability for these objects to be used following the fair data principles and that's the core of it it brings together institutional national and european stakeholders uh initiatives and data infrastructure to develop this inclusive open science ecosystem in europe uh the ideal behind this is is it's extraordinary uh and right now we are literally in the middle of this whole process uh started uh some years ago and now the the community um along with the european uh european open science cloud association um they're embarking on implementing what's called the sriya which is the strategic initiative which will allow the framework to how to implement the european open science cloud over the next seven years the expectation is is that um this will lead to new uh insights and innovation uh higher research productivity and improve reducibility reduce reproducibility in science uh this is the hopes of the european open science clubs bringing all of these uh communities together to create this phenomenal uh community uh of european open science cloud uh one of the services that uh that is already available uh to the community uh two researchers and those interested is what's called the uh european open science portal uh and the portal uh right now is uh it's a gateway to information and resources within the european open science cloud it is it is part of the european open science cloud implementation roadmap and as as one of the expected federated corps uh which is the set of services provided providing the means to discover to share access and reuse data and services the services uh the frederick core service is contributing to the implementation of the access and interface action line uh this this has been conceived by the europe by the european uh commission but do through delivering channel connecting the demand side and the supply side of the european open science club basically it is a it is a portal that allows you to access services a catalog of services and marketplace which acts as a entry point to the multitude of services and resources for researchers um if you indulge me here for just a second i can give you just a small um demo of it and as you can see here this is the the welcome page so we will browse through the catalogs and you can see here uh these are the various scientific domains medical and health services engineering and technology services and then there's then there's the generic uh domains humanities the aquacultural sciences this is uh here is the uh some of the communities that are involved um in the uh in the catalog and marketplace um the providers it's target users uh you get to browse um the various resources um [Music] so here's the different communities different providers um all of the resources um from the accounting uh framework open data platforms some portal services use cases depending on on what your domain is whether it's in artificial intelligence [Music] bbc um um [Music] elixir these are the various community use cases um let's get back to the uh to the catalog and marketplace um let's see here we go in here engineering technology we get to see some of the resources data care object in storage uh if you're if you're in need of storage this is this would be a good place to to look but as you can see here uh as it's as it stands now this is the portal of different for different catalog of different services [Music] and marketplace so that's sort of a small sampling of of the european open science cloud as it relates to catalog and marketplace uh the governance uh

from 2021 to 2027 uh is based on a tripartite um structure which includes the eu countries in the country the soviet countries that are associated with the europe uh the horizon 2020 which represents the uh eos governance board which was agreed upon earlier this year uh you can see here here's the model with the european open science cloud association the the commission and the steering committee it is this tripartite um structure with the association um starting it for the next six seven years in deciding which direction the various uh which direction european open science cloud implementation will go uh just a little bit about uh uh the next steps for the european open science cloud uh and it's this federated service um there is four uh four four different working groups i'm sorry four different task force and the uh the task force um is broken into various working groups uh and the they tackle topics uh from uh to uh through sustainability through ontology fair data uh fair metrics and data quality implementation interoperability fair use it rules participation all these the architecture authentication all these various things that relate to where the uh european open science call will go uh once um once uh once they're ready to re once they are ready to release it and make it available to the public it has gone through various phases uh and this last phase being the 20 20 21 2027 is where the year the european open science club association uh starts to talk about how to implement uh this particular document uh the sria document um again i won't go so deeply into it it's just to give researchers an understanding of the catalog and marketplace um and the services that are available on the catalog and marketplace via the open science cloud portal uh next i will talk about really really really quickly about citizen science uh what it says in sciences [Applause] citizen science can be described uh as the voluntary participation of non-professional scientists and research and innovation at different stages of the process and at different levels of engagement from shaping research agenda and policies to gathering processing and analyzing data and assessing the outcomes of research and very very very very simple terms in citizen science scientific process projects are carried out with the assistance or completely by interested amateurs the citizen science formulates uh questions reports observations carry out measurements evaluates data and or right publications uh compliance uh compliance with with scientific criteria as a prerequisite lastly this is this not only makes new scientific process projects and new findings possible but also enables a dialogue between science and society that is otherwise impossible or even difficult uh there are 10 roughly 10 principles of citizen science uh and this uh this these 10 statements came via a working group called the european citizen science association led by the national history museum in in london with input from many members of the association it set out some of the key principles which as a community they believed underlying good practice in citizen science um i won't go into all of it but uh i'll go be the first two or three citizen science projects actively involves citizens in scientific endeavor that generates new knowledge or understanding citizens may act as contributors collaborators uh or project leaders and have meaningful role in the project citizen projects have a genuine science outcome for example answering a research question or informing conservation actions management decisions or environmental policies both the professional scientists and the citizen science benefit from taking part benefits may include the publications of research output learning opportunities personal enjoyment social benefit satisfaction through contributing to scientific evidence uh to to potential influencing uh policy um and citizen science may if they wish participate in multiple uh participate through multiple stages of the scientific process uh this may include developing the research question designing the method gathering and analyzing data and communicating the results this is where i'm going to stop give the audience time for question and answer but we will make uh this presentation available um on zenodo so that you can look at some of the examples and also look at some of the ten principles of the of the uh of citizen science and i also uh provide why it's important uh the relevance effectiveness the creativity and quality uh transparency of science literacy and confidence in public research uh and i provide the examples three examples of citizen science uh that can be read at your leisure and then lastly i provide the uh the bibliography links to the fair data principles and bibliography to citizen science um so with that uh in mind uh in my bridge presentation on european open science cloud and student science i will stop sharing and open the floor up to to potential questions so now we have time for some discussion maybe i'm not sure if we had any any questions in in chat or if there was just the one that you john answered honestly or if you if you would like to ask anything right now you may you may even both raise your hand or write something in the chat but we went through a lot a lot of different topics it may be a better idea to just hope that you are inspired in some in some areas and that to be interested to know more and to more in a more deeper webinar so we have here the next uh next sessions which you can see here if no one else has a question i i would have i have one i have a question to richard i'm sorry but for me no it's just because i think this one is the only webinar we where we have the european open science cloud explicitly as a topic and so i was just wondering about this um the portal and especially the marketplace for for services which are available right now so are there any specifications which services are included there for example with regard to the business model so if i look for data archive or storage infrastructure will i only find public providers there on non-commercial ones or is it also open for for example for commercial i.t suppliers and stuff like that yeah it's uh it's uh to answer your question it's you you'll you'll find uh private providers and open science uh on the uh on the marketplace you'll find all kinds of different services there there are some services that that is really that's readily available in and they're already providing services to to researchers uh from their interface um some of them just basically have uh a basically a front page where they are they are still developing and implementing the services um on in the marketplace there's a there's a rigorous uh process that that that that they have to undergo um before they actually start to provide the services but uh but the ones that are there have been have been rigorously um uh have gone through the process so they are they are they are either public services private services um some of them come from institutions some of them come from non-profit organizations and for-profit organizations uh and there and there are some of them are domain specific some of them are non-domain specific basically domain agnostic it's just it's um literally a multitude of services that are that are being provided and i would say that they they're adding uh services on a regular basis so so if you're looking for something today you might find in the month or so they'll be made available uh in a month or later but this is one area of the ex of the eos that is that is continually being developed continually being enhanced in this sort of the first phase of of the european open science cloud there's a much there'll be a much much broader uh services made available on a federated basis you know after the association and the task force has done the work which which uh we have which we have just started um basically a couple of weeks ago so in the meantime we got the question in chat so maybe would you like to answer it all right i mean i can say something but also richard if you want or maybe i start in richard you can you can add on this yeah i think that's a good question so the question in the chat is uh how open signs to general data protection regulations so protection of for example personal data and stuff if you want to share in the data or only and things like that and i think that's an important question and especially if you have they of course only if you have data where some kind of specific protection rights apply so for example um personal data but also if you are in literature research or so copyright issues might arise for art historians know this particularly well for example so and the simple answer is of course um open signs can only go as far as the general legal framework allows it to do so you have to respect all the data protection rights for example and there might be data you cannot make openly available so that is why richard stressed so data shall be as open as possible but as close as necessary but and that's the that's one important aspect i think and it is important to to think about open science in a in a holistic way or always have open signs in mind doing the whole research process because of course you might be able to share your interview data also if also if it's interview videos or stuff with people inside if people agree to do so so if you get some kind of content and you might be able of course people can later on take this back and that may may cause some problems but the important lesson i would say is think of these kinds of possibilities to open up research products right from the beginning because if you have an informed consent and people agree that they you share the interview for example you might be able to do so but if you don't have the content right in the beginning and you only think about it after two years when the project has finished you might not be able to go back to the participants of your study to get the consent so yeah but of course the regulations are in place and have to be respected richard what do you want uh i i i i don't i don't have much to to add in in that area except as i read the uh as i read the chat question um uh can can you share uh interview data i would i would say that there's that there are i'm not gonna say you can share it and i can say you cannot share it i'm going to say that the gdpr is is it's very specific about what you what you can do what kind of information that you can make available and what kind of information you cannot make available so um and and one thought is an anonymously anonymizing it so if there is no way that you can attach that interview to a particular person or entity um then then you are in compliance with uh uh with gdpr but if there's no that you can there's no way that if there's no way you cannot anonymize that or there is a way that that a person or persons or groups can be identified then you are in violation of gdpr are you would be in violation of gdpr if you made that information available uh i would also say that um [Music] there's there's uh there's there's this question about uh metadata uh and the description of making uh potentially making uh these transcript these transcripts uh available uh you can you can certainly describe your your interview uh and metadata meaning that you you describe the metadata uh and you and you secure you secure the data um so that it doesn't be so that it's not made made available to the public and then afterwards you have the ability through through repositories that have this functionality um you can validate the person or persons or groups who may want to have access to your to your interview data there are many ways to to make this information available but i would also stress that you would have to be in compliance with gdpr meaning it's just not something you would you just would not make this information available through any open repository without first checking with uh with gdpr requirements that that would be my uh my additional thought on that thank you both we don't have any other questions i think but this was the example of certain things that can oh maybe some all right this is just just response so uh this may be example of what we can do for for you is this part of the support and you can see that we are trying to think about these questions on every university from 4u plus there are some people you you can try to contact and and you may you may ask them how really the support looks like on for open science on your university i would uh advise you to check the uh check the web page page with registration and you can see contacts for for all universities and if you are interested in any topics which are discussed here now or any topics that will be discussed in the future you can contact the people from your university there and yeah we can actually use the alliance to communicate these things together as well so feel free to get in touch with us and there are more okay that's generally no more questions uh so here you can see this three three next sessions will be more specific some of them will be very interesting uh

especially because there will be some something that won't be that are not discussed for example in our university and you can see this topic in these sessions and with that check the webpage we will send you some feedback form and link to the recording i i guess and we will be very happy if you fill it in and tell us how how did you like it and which which part of open science seems to be interesting for you and which part you would like to see more no more so with that if we have no more reaction from my colleagues we would like to thank you for your for your attention and for coming here and we hope that we will see you again on some of the next sessions that are part of this series so thank you very much everybody and have a nice evening bye bye thanks [Music]

Born in the 1990s with the rise of the Internet and the establishment of the first open archives, the Open Access movement gradually developed in the 2000s through declarations, political incentives and the development of new publication methods. In recent years, in the wake of the open data movement, this movement has expanded to include research data and evaluation issues (open peer review). Today, institutional support at national, European and global level is encouraging the acceleration and generalization of this movement:

In France

- a favorable legal environment: the [Law for a Digital Republic](#) (2016)
- a global policy: the [National Plan for Open Science](#) (PNSO) in 2018, followed by a [second phase](#) in 2021

In Europe

- Plan S of COAlition S
- Horizon 2020 and Horizon Europe research programs

Contact

Marc Bergère

Open Science Project Manager

marc.bergere@univ-rennes2.fr

Gaid Lemanner-Idrissi

Vive-president in charge of Research

gaid.lemaner-idrissi@univ-rennes2.fr

Further information

- [National plan for Open Science |2018](#)
- [Second French Plan for Open Science | 2021-2024](#)
- [Plan S : Principles and Implementation](#)
- [Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities](#)
- [Jussieu Call for Open science and bibliodiversity](#)
- [San Francisco Declaration on Research Assessment – DORA](#)