

# NASA Transform to Open Science Community Panel 2022-05-18-09...

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## SUMMARY KEYWORDS

science, modules, open, community, data, nasa, curriculum, github, repository, mentioned, materials, engage, next slide, hope, subject matter experts, folks, people, researchers, discipline, great

## SPEAKERS


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Karla Mastracchio 00:00

to see everyone. All right, next slide, please. All right, we're gonna go over just like we did yesterday, we are gonna go over some light housekeeping and some ground rules. We are still using hashtag NASA tops, and hashtag I heart open science. For our Twitter handles and you we're all we're really active on Twitter. So we hope to see that again today. And there are graphics that I can send you for posting on Twitter if you'd like that. All right, next slide, please. Thanks. Okay, so we're just going to go over the Code of Conduct really quickly. Okay, so all participants just like yesterday, are expected to be treated with respect and consideration. Of course, we value a diversity of views and opinions. We would like everyone to be considerate, respectful and collaborative, communicate openly with respect for others critiquing ideas, rather than individuals. And we really emphasize that yesterday, avoiding personal attacks directed towards other participants, of course, be mindful of your virtual surroundings and have your fellow participants alert one of us and alert a host if you notice a dangerous situation or someone in distress, respect the rules and policies of this virtual meeting space. And then of course, I'll go through the list of unacceptable behavior. Just really quick, um, no harassment, intimidation or discrimination of any form is allowed physical or verbal abuse of any participant will not be tolerated. And examples of unacceptable behavior of course include I won't read all of these, but they include but are not limited to verbal comments related to gender or sexual orientation, disability, physical appearance, race, class, gender, national origin, or any sort of inappropriate images in the meeting space will not be tolerated, and disruption of proceedings, panels, discussions, or lightning talks will also not be tolerated. Next slide, please. Thank you. Alright, so accepted behavior. expected behavior, excuse me, anyone requested to stop unacceptable behavior is expected to comply immediately. And we may take any action deemed necessary to appropriate including immediate removal from the meeting. Without warning. If you are the subject of unacceptable behavior have witnessed any such behavior. Please notify a meeting host. And if anyone is experiencing or witnessing behavior that constitutes an immediate or serious threat to public safety is advised to call 911 or your local emergency number. Like Thank you. Okay, y'all. So this is our QR code. And like I explained

yesterday, and I will drop it in the chat, I will drop the direct link in the chat. But this is the QR code that will take you directly to our i o tool, and your inputs are essential to the success of our mission. So please feel free to submit questions, feedback or suggestions via this tool. And again, once again, I will drop that link right in the chat and should be in the know. All right, thanks. And I will turn it over to Dr. Chelle gentemann for the agenda. Thanks.

 Chelle Gentemann 03:04

Hi, everyone. Welcome to day two of the Topps community panel. I am so excited to be here with you again. Today, we will be talking quickly about the expectations of the panelists. And I'll get to that slide in just a minute about what we expect from you, and how we want to engage with you. An idea behind it is going to be do the recap of day one and sort of talk about we we had so many great questions in the chat from participants and people submitting questions from the I O tool, which Karla just chatted out a link to the IO tool. We can continue to submit questions there and upvote them. Also, we will usually we'll use the IO tool during the day. And we'll get to some of the chat questions the next day. But we're going to try and get to some of those questions that we thought people might want to have your answers do. We will get to all of the questions through our GitHub site using GitHub discussion. So you can also feel free to post your questions there. We'll have a overview of this open core curriculum, go to a break discussion, engagement of the open science community a break and then testing management, continued engagement. So this is where we actually start to get into how we're going to prepare for the year of open science. So next slide, please. And I want to take a minute and just sort of sit with all of you. NASA scientists are studying the mysteries of the universe, other planetary worlds, our Sun, our planet. And you're all NASA community panelists now for the Topps project and we are so excited to have you be part of the NASA family. It's, it's really just so inspiring to me every day the science that NASA is doing and we will Want to make this even better by moving towards open science practices. And that's what we're here to do is to take science make it more efficient to make it more open to broaden who can participate in science. And we need your help as panelists to do that. And that's why so our meeting objectives the first day, we really tried to do an introduction to the transformed open science project and sort of our plans, what we thought about in the last year as we've been developing this project, and where we're at, now, today, we start to do key preparation for the 2023 year of open science, which is coming up in just seven months. So we have a lot of things to do. And we want to hear from you about is this the right direction? Is this what you think is going to be the best path forward. And then the final day, we'll start talking about how we're engaging with both the NASA community and working to expand who that community is, so that we broaden participation and what sort of opportunities are available, and how we can really, really lean into that. So the panel review, what we're going to be asking you to do is it's very similar to how NASA runs proposal review panels, which is, we will be providing you with a synthesis report early next week, it'll be in a Google document. And we're looking, it'll be organized around these three days, and these three topics. And then we're looking for each of you to provide comments on those if you have them. And ideally, provide talk to each other, we can set up calls, we can set up additional meetings, or you can just use the Slack channel and the Google Doc. But what we're hoping is that there's some sort of integrated response from the panel. And this often we call these a panel review where you take individual comments, and you sort of synthesize them into a cohesive holistic response. And we're hoping we would like to get that from you by this June 17. And thank you Next slide. So we're really excited. And you have on IV, the talks program manager is going to talk next about day one.

Y

Yvonne Ivey 07:12

Thank you shell. So yesterday, there was a lot of conversation. In a shell mentioned. I think we're all really fired up to jump in and support NASA's latest initiative around transformed open science. But I want to throw out a couple of quotes from a couple of folks yesterday, I heard be an example for people across the world, moral imperative, collective action inspired to engage focus on our users. Those were sort of sound bites from folks who are on the panel. And I really want to give kudos to y'all for really, truly bringing that all your expertise, but your passion to this meeting. You know, it's three days set across different time zones with different schedules. And I really want to thank all of y'all for taking the time to truly help make this mission successful. You know, we have so many questions to answer from not only this chat, but also the IO tool. And I really want to kind of take some time and answer one of the the larger questions that came up yesterday, which was really around sort of, how are we measuring our success? When we set up this project, we sort of had one thing that chelle and I looked at each other and said, We're going to make this open, we're going to do this out in the free and we're going to make mistakes. And we're going to you know, figure out things that we had never even really thought of. But our goal was to drive open science across the not only the science space, but also bring in folks who are STEM focus and give them a seat at the table. And so although our our plans right now, we're very focused on how do we prepare, and really get not only buy in from the community, but also all of our stakeholders who are traditionally left out of our NASA research projects. We're really spending these next seven months to to get the support that we need to be successful. And so I do want to sort of share some concrete things that we are doing in the background, and I will sort of spend more time tomorrow speaking to all of them, but you know, if our goal is to create a more diverse and equitable space for science, we're really looking at what funding opportunities exist currently. What are what are the other existing programs where we engage with marginalized communities at NASA throughout our solicitation process throughout our target outreach opportunities. So yesterday, I mentioned science activation, which is one of NASA's per grants where they actually go out and engage with communities, getting them the data, and then educating them around how to use NASA data that's from preschool all the way to, you know, retirees who are, you know, spending time with the coast and are interested in what NASA is doing around oceans. We also have our citizens science community, the folks who are maybe traditionally left out of NASA solicitations, but are actually taking our data and developing applications to actually have folks who are not traditionally scientists work with NASA data. You know, our, our focus right now is getting an amplifying those voices of folks who are already doing this work, and helping accelerate their paths forward using open science. And so as I mentioned, you know, we're also engaging with smart minority serving institutions. So really going in and having conversations with organizations, which we hope to announce soon partnerships, but organizations that actually work with educating and bringing the resources that minority serving institutions need to either propose and work throughout our roses, solicitations, or our broader larger solicitations, which are called Ayios. So as I said, there's a lot of things going on in the background, and I hope to really dive into them more tomorrow. But I did want to at least answer that question, because it was a trend that was coming through of like, how are we measuring our success? And what are we actually implementing and doing outside of sort of bringing everyone together to have another meeting? And I would like to kind of turn to chelle to see if there's anything I'm sort of missing that you want to highlight on on day one. We hope to get the recap out of the longer recap out by the end of the week. All right. So with that, I think I have the pleasure of sort of turning this over to the main scene for today. And shall you'll sort of kick this off for us.

C

**Chelle Gentemann 12:14**

Yeah, I really want to pause for a minute so NASA and the American Geophysical Union so AGU have had a long term relationship, and have worked closely together for a very long time to advance science for the public good. AGU if you're not familiar with it, it's the largest society of earth and space sciences in the world with over 130,000 enthusiasts 60,000 members and about 30,000 people attending their annual fall meeting. NASA is the single largest institutional contributor to AGU publications, with about 12,000 articles. They really are a true partner with NASA to amplify and increase the impact of science for public good. And we're really excited that they are contributing the open core curriculum to the Topps effort. So we are incredibly excited about this partnership. And they're going to introduce themselves now. So thank you.

S

**Shelley Stall 13:17**

Thanks. So it's actually sitting right next to me. So that's, that's kind of fun. So I'm Shelly Stahl. I am the Vice President of data leadership at the American Geophysical Union. And if we could go ahead to the next slide, that would be great. I'd like to introduce you to there's actually several layers to our team. So online with us today is Lauren parks, the Senior Vice President for meetings and learning. And Lauren and I are teamed together at AGU for this partnership with NASA. Brooks Hansen, our Executive Vice President for Science also on the call Chris Erdman, Assistant Director for Data data stewardship part of the data leadership team. And Laura Lyon, Program Manager for science and making sure that we stay on track for everything. And we have additional team members as well we've we have consultants and we have actually really fun open positions I'm going to tell you about. But I think the most important thing to highlight for you at this very moment, if you could go to the next slide, please, is the fact that this team also includes all of you. We absolutely can't do this without engaging across the community for all everyone who's interested, you know, experienced in open science for many, many years all the way to those who just really want to know what's happening and get get a leg up. We need every person to give us a hand here who who's willing to give it a go. So we're you know, we're also working with consultants, the learning modules that we're going to put together are going to be on a open platform. We are asking folks that have done this before to the experts to help us out. Make sure we do this the right way. And we're open to all kinds of suggestions and advice and you know where to get have is to provide all of that. Next slide, please. So here, here we are open science, we you heard shell and the team talk yesterday that we are trying to figure out how to not only show everyone would open sciences, but also do it ourselves, I can guarantee you, we will not be perfect at this and you will all give us your feedback as to how we can be better and we are open for that we are, we are excited to hear your thoughts so that we can all improve. One of the reasons I love this partnership is NASA wants every researcher, either those affiliated with NASA, or any other science discipline to be part of this effort. The modules we're building will be discipline agnostic, it won't matter which discipline you're from the elements that you'll learn about that which we're going to walk through in just a second will apply in ways that will be valuable to your work. And we are excited to be part of that gain access to all of Agee's disciplines, and all of our partners across societies with other disciplines to engage and involve them. And most importantly, internationally. The there's an interesting publication that nature did for their 150th anniversary, where they they mapped all of their publications, showing in the one of the slides that they provide, is showing that the single authored papers are nearly gone. And what's increasing, even beyond lab mates from a single country, what's increasing our international teams. So the reality of research in the future is that no matter what career level, you're in, where you are on your journey, the probability of you being on an international team

is incredibly high. So what we do here with this work has to work for all of our colleagues all around the world. And we all know that the earth and space sciences doesn't live all by itself, we partner with every kind of science just about. And if we don't do this with everyone, we won't have the impact. That's that's that we're trying for. And it's gonna take all of you because there's only a few of us. Okay, great. Next slide. So let's talk about the open core modules. So think about this. I said, it's, it's discipline agnostic. So you know, it's gonna be pretty high level. But it will get into what it means to work in an open science environment, not only within your teams, but also within your community and worldwide. And that the fact that open science isn't a checkmark, it's a journey. And likely we will be on this journey during our entire lifetime. So you don't just take a class and you are perfect at open science. It's you learn about it. And that's what this will do, we're going to introduce you to the concepts, the core concepts that were that we have laid out, there's five. So the first the first thing ethos, the way we talked about this as age used, no matter what you do, no matter where you are in the research lifecycle, everyone should take the first module, each module is planned to be about two and a half hours, it will be able to be delivered in both an online platform as well as in person. And we a little bit later in our presentation will talk to you about what in person means that's going to be very exciting. Getting to be out there with people again, please COVID, please let us do this. So. So that's the very first module, there's a slide that will articulate that in more detail. And then tools and resources we are this will be really important, especially for those that may not be up to date on some of the most useful tools to work together and more openly than open software, open data and open results. This is something that we do a lot of my work in the last few years has been around open results, how to have a digital presence, how to make your work, accessible in ways that people can find you not only through your publications, but also through your data and through your software and collaborate in what does that mean, with GitHub? And what does that mean with different repositories? We'll cover that within all the modules next. Next slide, please. Although I'll tell you what this is, could you just backup one, this is the slide that we just have a slight mention on badges. We do want to recognize in different ways how people are completing each of these modules. So we will have a type of I see it says microbead here that may not be the name by the time we rolled this out. So just take it as an idea for the moment that they're you know, each module will have some acknowledgement of completion. And then for the five modules together, we'll have something more so substantial, you can see the word badge and certificate there. We think we think, well, we want to cling to the word certificate because we think that's more meaningful to the community. Now, not everyone is motivated by a badge, we realize this, but we are seeing within the community and with NASA's help, that the having a badge or a certification will have meaning within NASA's grant process, I'm going to let them talk about that, that's out of our Swetland. But what we hope will happen, and if you if anybody here represents any of the other US federal agencies, or even international funding agencies, if you're interested in seeing what it would mean for you to recognize a open core core, open core open science, certification within your processes, please let us know because we would like to make this meaningful, such that it's actually something people want to achieve. And so talking to the panel is different ways to, you know, have incentives, different ways to motivate folks for completion. Not you know, you see, this says things that are mandatory, which sometimes you have to do to move the ball along. But we also want an opportunity for people to realize that this is actually valuable to their research. So both sides of that balance. Okay, next slide. So let's, let's just give you a sense for the first module, I am not reading this all to you. So take a look, it's in the slides. And also realize that we will have a team of sneeze that will walk through all of this material. And in just a few more slides, I'll talk about that. So this is this is the idea, this is not a done deal. But we do we we do have the team to come in and help flesh this out. So when you when you co develop something, you want to bring people in to tell them about it. But you can't get too far along without having them there to actually finalize it. So that's where we are, we

have these ideas, but we know that subject matter experts will contribute significantly. So this is the idea, the concepts around open science. It's things that we would like to include history, the second bullets really important, because we're very aware that having this project based within the US, it will have a very us bend to it, unless we're able to have good enough representation across the international community and different, you know, low middle income countries, as well as those that are, you know, somebody within the US, the viewpoints are incredibly different. And we want to make sure that we're representing that we're sensitive to challenges. And I think all of you can think of things like bandwidth and access to high performance computing, and how do we think about that? So So that's, that's where that's coming in. Community science matters. diversity, equity, inclusion matters. How does that play into open science? Well, well, that's the point. If we open science up, we want it to be equitable.

M

Monica Granados 23:39

There's a couple of us that have lost audio.

S

Shelley Stall 23:47

How's that? Guys? Is that a little bit better? Yeah, you're back. Thank you. Yeah. No idea that the please let us know if that happens again. Technology, open science open challenges. Here we are. So yes, so making sure that that the subject matter experts that are familiar with the challenges for equitable and diversity, as well as community science are part of this. How do we measure our success? We for this project for the things that he was doing, we do have metrics. But we want the metrics to also be for the community at large. How do we think beyond that? How do we think even more broadly, so if you are if you've done this, you have materials on this, we don't want to build anything new. We would like to connect with the folks that are already working on these things, to pull it in give attribution, of course for that work, and have you as a partner for making sure we have the best possible answers for these questions. All right, next slide. So this is the tools and resources we See this as the module that will probably need to be updated as much, quite frequently, because we do see the resources that are coming in and the tools coming into the quick change. So we have that in mind. Just a couple things here. But you all know that there's quite a large list of what's happening out there. And that's, that's what we'll do here. And resources can also be access to communities, discipline communities, for instance, where folks are working on open science specific to their communities, and making sure there's connections, there's, those are just some ideas. Next slide. So now we're coming into open software and open data, we, I, from my point of view, these are very different things. How we handle open software is very different than how we handle open data. And we want to just make sure all of those nuances and how they're related are clear. We fully understand that these things are mixed in many ways. Sometimes you have them both together in one package. Yep, that's exactly what we're going to dig into. So next slide, we'll bring a bucket data. And I use the module objective list. I think when we were looking go ahead to data, the module objective list for open data was actually quite long. I decided to skinny it out because I said, Well, fair covers this and fair covers that. So I'm just gonna say out loud. I doubt there's anybody on this call who doesn't know what fair is. But just in case I'm absolutely wrong. This is an initiative that's been around since 20. Oh, it was published in 2016. The FAIR data, fair guiding principles certainly was being developed prior to that. And it was really an inflection point for the community, all disciplines on making sure data and other digital objects are findable, Accessible, Interoperable and reusable. And here, with

the tops program, you will very commonly hear us say the R is reproducible. That's, that's deliberate. So we'll navigate the vocabulary, it's probably driving a number of people crazy, but we are using different definitions for our will have to nail that all down. But here we are looking at for open science is being able to build on the science before and the closer we get to reproducible, the better that is. So you are hearing it, you're not crazy. We know what's happening. And we mean it. But we also mean reusable. So we'll we'll navigate that vocabulary. And, yes, if you're annoyed by that, please volunteer to help us, we really would love to have you. Next slide. So open results. So here's what it means to have a digital presence, what it means to work within the lab openly, oh, I'm not sharing my software until I'm ready. Yes, you know what, that's okay. Not everybody has to share at the very same time as everybody else. Sometimes you need to hold on to that till you're comfortable sharing it with others. But to ensure that there's the highest quality possible, you know, you want to maybe put some lab guidelines into place that requires some sort of quality, check QA QC someplace. So we'll talk about those things. And then we'll talk about what it means to publish openly. We'll talk about what open access means. We'll do that with not only data and software, but we'll also include the information you need about publications, open access for publications, he is very supportive of this. And we're, as you would know, our journals are slowly moving towards open access. One at a time, it's we're bringing the community together. So we're really excited about that progress. So if you I'm trying to run with the next slide is Cindy, can you just show me the next slide. And we may just want to? Yep, I'll tell you what, let's hold right here. And we'll open it up for discussion. But one of the things I want to let you know about is we do have an open position on the AGU team for a program manager. And I'm just going to be blatant because everyone who you know is interested in this is probably on this call or will hear the recording later. But we would really like folks to consider it if you if you want to join the AGU team on this. We we'd be delighted to consider that in you're welcome to share the job opening with anyone you think might be qualified. So open discussion, and you want to help me out with open discussion.

C

**Chelle Gentemann 29:26**

I'm happy to jump in here. So maybe we can take the slides down. And we can see all the panelists. And I think what we're going to do again today is start having this discussion. And we want to make sure that what we found is as top started going and talking to everyone that we could find that give us a half an hour to talk to them was that everyone had a different ideas about what open science was. And so that's where this idea sort of came from is let's, let's create a baseline. And so we'd like to hear from the panelists the your thoughts on what Shelly just presented. And because I can't, I can never see if people have their hands up. But I think we can do it a little bit like yesterday, if I can ever see the panelists where we start to. So I know many of you have experience with education, creating educational materials. I know many of you have experience with teaching large classes or deploying materials across, you know, national scale resources. And this is where we're sort of looking for feedback from you as to whether you think these modules contain everything they need. How any guidelines. So Fernanda?

F

**Fernando Perez 30:59**

Yes, I was curious about what you imagine, being able to use these types of modular materials in a in a more traditional classroom setting, I happen to teach a course at Berkeley we just finished, which is precisely on kind of open and collaborative data science, shell actually gets

lectured this term for us. And I would love to use some of these materials in a regular classroom setting. This is an upper division, undergraduate crosslisted graduate course that's taken by students in data science, statistics, physics in for many, many different majors. To end in, I think it would be fantastic to be able to use these materials in a classroom setting, which is a little bit different from a professional conference setting. You imagine that these would be reusable in that fashion? Is it? Is it useful to think of it that way? Or does it become a distraction for you right now to be pulled in too many directions? And I have no prior on that. I was just curious how you're seeing how you imagined the program.

S

Shelley Stall 32:02

Yeah, so the modules for they'll be open. So all of the content will be accessible for anyone, both the ones that the materials that will be on the the online platform, as well as what we'll have available for face to face. So you're going to be welcome to take and tune it any way you want.

C

Chelle Gentemann 32:23

And one of the goals, Fernando is really thinking about these modules as developing them on GitHub, getting pulled into the open edX platform. We want them every we want to be useful to as many people as we can. And especially for undergraduates. This is a great opportunity for them to get a certification and a badge from NASA in doing open science. And we are hoping to link this to internship opportunities, mentorship opportunities, and incentivize this as much as we can. So even though it's on this Open edX platform, the resources are all openly licensed available, so that we'll have scripts that will you can either show the video or teach the script yourself in class, use the workshops and the material so that these are resources to be taught in class, in a workshop online in virtual cohorts. And we really, we're really hoping that especially if we are able to get this into undergraduate populations, and engage with them, that then they look to NASA for other research opportunities in the future. Oh, there's lots of hands now and I have lost track. So I am going to Monica Malvika Logan and pen Yun and I think it's probably doing it alphabetically, I'm not sure. Awesome.

M

Monica Granados 33:51

Okay, so I have a couple of comments. The first is amazing. This is this sounds super duper exciting. I'm wondering if you're thinking about pulling from some of the existing resources, which I'm sure sure you have. But I'll throw some some things out there in case they aren't on your radar yet. The people at open Life Sciences who lb gets here has some awesome resources were pre review and open life science comes from the Mozilla open Leaders program. They have a lot of really cool things on there about open software. So pulling from there would be great if you have any content on peer reviewing. Pre review also has a lot of openly licensed resources that you can pull from into your modules. So there's think there's a lot of stuff there that you folks can already pull from but I love the idea of putting all these things together because I think they're the resources are kind of scattered in terms of like licensing, you know, something that we could have a conversation offline as part of my role with Creative Commons to To help you folks make sure that we're using the right licenses to help with open educational resources. There's a lot of different Creative Commons licenses. And there's some that are



better for open educational resources. So we'd love to talk to you about that. And then any content that's in the modules about licensing, for example, like data, we generally don't copyright data, we just give it it's a cc zero license. So stuff like that, that we can we can talk about offline to make sure it's like in sync with, if you're interested with with the recommendations that we have at Creative Commons. Absolutely.

**C** Chelle Gentemann 35:37

Yeah, and we've definitely recognize, there's so much out there. And that's part of why we're able to do this on this really, actually exceptionally short timeframe. You know, creating a course and getting it recorded. Getting it online, getting it operational and up on Open edX and a few months is, would be an impossible task without the sort of decades of contributions to open science education that are around there with you mentioned some there's also like the terrain way, and other resources. And part of what we want to do is where we can work with those groups to elevate their content as well.

**S** Shelley Stall 36:16

That sounds great. I think that's worth but stopping because we are not walking into this creating something that we want to take credit for. We are walking into this, to highlight the work of all of you, and all of the other subject matter experts to give you a platform for the work you've already done. such that it can be presented at scale, it is so hard to do training at scale. And because of this, because of Shell because of NASA, because of tops program, because of the commitment that NASA has made, they're giving us an opportunity to do this. And once you make it at scale to 20,000, researchers, you can easily make it at scale to 300,000 researchers. So we're doing that, why not? If we're going to go big, we might as well go really big. And it's not that we want to make the content, we want to give you access to the people. So that's what we're trying to do. That's our that's

**M** Monica Granados 37:20

yeah. And that that can't be underscored, because we've had trouble at pre review with that scale. And mostly because we don't have the people to do it. But you folks do, right. And that's what's so exciting about this is that you're putting those resources in that like we can reach that like critical mass. And I'm super excited about that. And I'm all here for the Creative Commons approved for you to help you folks with that.

**C** Chelle Gentemann 37:41

Thank you. Thank you so much. I think melt. Vico is next,

**M** Malvika Sharan 37:45

I have very little to add to that because I basically had the list of Open Sans carpentries, open escapes, greater view tearing way, all of them have been mentioned. And I really, really appreciate that this, this opportunity will also give the grassroots communities as Monica was

appreciate that this, this opportunity will also give the grassroots communities as Monica was saying that capacity is really, really low. And we are all constantly looking for funding and sustainability of these organizations that are actually making real impact in the community. So that would also help us reimagine what sustainability of open science communities look like, beyond the work that we are doing. So scaling the effort, as you said, you know, creating Train the Trainer program, really drawing from the carpentries has been doing exponential growth of skilled people making other people more skilled. So that's really, really exciting. And also reimagining how we deliver. So, you know, pulling on what Fernanda was saying that maybe same material does not fit in all all settings. And different kinds of trainers can reimagine how it looks like. But what definitely has worked, which has also been tested in in MIT, when they were trying to deliver ethics related courses is experiential, and blended learning where it's not really about I tell you what is right, we give you a tool, you go over in your world, and you experience what it looks like. And that's really about contextualizing what we teach in open science. So within NASA, I can also imagine people are working with different data, different kinds of people. And therefore even though we are teaching them about open source, they would have to reimagine what it means to them. And at the same time, yesterday, we talked about as open as possible, as close as necessary. So really reinforcing that fact in that training.

S

Shelley Stall 39:31

Yes, I think all I can say is yes.

C

Chelle Gentemann 39:36

Yeah. And I also want to point out that because we're doing this on GitHub, and we have ASU sort of supporting this as a maintainer. We have a roses elements that we've talked about publicly before, but we're going to be funding extensions to this curriculum. And because it's just on GitHub, anybody can also you know, contribute extension. So this is a basic course by it like Fernando has this whole course on reproducibility. Like, there are so many people in our community developing high quality courses that again, just sort of lack access to this scaling of it. And that's something that we can try to help with that I think carpentries, like their community contributed modules is a really great example of that. Sorry, if I'm stealing your comment. But, you know, there's so many things that the people in this panel have worked on, and sort of, we see and we want to borrow, you know, so thank you. And I think Logan was like,

M

Malvika Sharan 40:39


Can I Sorry, just take 10 seconds to mention one organization we haven't mentioned, which is good for science and society, which you already know, I think what they are doing is also really helpful, because what they do is go to these communities of researchers who are doing fantastic work and allow them to prototype their idea and make them valid enough to ask for better funding from different organization. So yeah, just wanted to add that here. Thanks.


S


Shelley Stall 41:08

I'm seeing a lot of suggestions coming to chat on I lost track of our time,


 Chelle Gentemann 41:13  
but we were still in discussions for 30 minutes.


 Chris Erdmann 41:17  
You we still have time.

 Shelley Stall 41:18  
So okay, I just I'm sorry, I forgot to write another time. Yeah, there was a recommendation for open science trainers. I think that's a really I really liked that idea. We, we haven't showed you all of our our crazy schedule yet. And you're going to think it's crazy. But I'll tell you what, I think it's going to be worth really pushing. But we will have a train the trainer event in November. And I think that's a great idea to consider a certification for that. Thank you so much. We that had we'd missed that one. Just rolling back introductory modules. You know, we talked about introductory modules. So I do think we should probably have a set certainly don't want to create something that I think there's there's a lot out there on fair. Another one. GitHub is a really important element. And we you know, not everybody's comfortable in that and making sure people are spun up. Yeah, okay.

 42:18  
Shall we have a couple of hands? Oh, sorry.

 Shelley Stall 42:21  
I'm sorry. shall go ahead. Where?

 Chelle Gentemann 42:23  
I think Logan, you had your hand next. Oh, you're muted? Up still muted? still muted. still muted. Interesting. We hear you.

 Logan Kilpatrick 42:43  
Oh, weird, very weird. I was I didn't touch anything. And it just started working. So I was just saying, we need this conversation. It's been great. And I wanted to suggest two things really quick one for on the on the incentive piece and talking about badges and things like that. I think getting like the really the challenge with the badge. And any sort of recognition is like, where do you put something like that, like, it's not a physical badge like I don't, I'm not going to

print it out. And maybe I would hang it on my wall or something. But like, I think getting the badge where people are actually doing open science, I think is really important. And like one place for this could be like on GitHub specifically. And I don't like the badge like partnering with GitHub is one option. That might be tricky, because they seem to be very selective about where they're actually giving those badges out. But another way of doing this that I've seen other folks have success is making some sort of like, public GitHub organization, it could be like NASA open science. And like, after you've completed the training session, you get invited to the organization. And that is, you can now set that publicly on your profile. And people can see oh, this person is, you know, part of this, NASA open science movement, and not slow way of sort of being able to publicly show that you've done the training and things like that. So I think that is a really strong option, as far as having somewhere to actually show your badge. And the other piece of this that I was just thinking about is any any thoughts on like, we all know that the attrition rate for MOOCs is really, really, really high. And I'm wondering if there's any, like it's like 90% or something like that people don't finish the the actual course. But when you supplement that with some sort of live or synchronous or something like that, it goes up significantly. So I don't know if there's any thought that's been put into sort of any any blended learning and I think Malvika mentioned some of this before, but I think that'd be really great to have that as part of this.

S

Shelley Stall 44:44

We are going to have two offerings. So so it's two and a half hours for each module. So we're, we're hoping that that's not onerous and that you'll make it all the way through and we are committed to making this engaging. Think video think animation, think you know really high quality product. So? So yes, we're we're hope we do know about the attrition problem. And we're hoping that we'll be able to at least make something that is approachable and doable in a in a, in a quick method. We the other part of your question certification. Oh, go ahead. Yeah. Yep.

C

Chelle Gentemann 45:22

So, Logan, we have a document that we've developed on the certification because I think you're right with the attrition rate, we have to provide, we have to do two things, we have to find alternative ways that are more engaging to get people to complete the material. And two, we have to incentivize it like you suggested. So we have a whole document that we have, both of the things that you've mentioned, have been on our minds in regards to how we're going to do the certification. And I'd love to share that document with the panel. And then we can get additional comments on them. We, we have like sort of two paths identified or three paths identified. And we're working with multiple partners to move that towards a realistic certification process that's going to be associated with the the open core. And the second thing is that we've also mentioned this publicly several times. So I'll also state that we do have roses funding elements coming out probably within the next month, to fund summer schools being held at various institutions for science teams, so that we can train entire teams in open science and wheat. So it's summer teams, it's also going to be virtual cohorts, and other suggestions for hackathons and workshops. So we have additional funding that will be competed to provide, you know, more in person opportunities and virtual.



L

Logan Kilpatrick 46:52

Yeah, I love that. I also really someone mentioned in the in the chat about using LinkedIn to do something like this, I think it'd be really interesting to explore as well, because again, they seem to have done a good job with things has had models and the way that you get certifications and things like that. So that'd be really cool. If there was like an open science certification and provided by by NASA and ag, I think it'd be awesome.

C

Chelle Gentemann 47:14

Yeah, thank you. And I think Penn Yun was next.

P

Pen-Yuan Hsing 47:20


Okay, thank you. I. Yeah, well, like as school if you were talking like so many thoughts are coming to my head, but I'll try to summarize a few of them. Number one, in response to Fernando's first comment, I specifically suggest possibly including some sample syllabi, for how this could be taught on an undergraduate level, what maybe even a high school secondary school level, I don't know. But having, you know, a syllabus that an educator can look at, I think will really help them build on this material, make use of it, at least in my limited teaching experience on the undergraduate level. But the other thing is more of a technical suggestion. But I think it is really important for the infrastructure of this to work well, which is, it's amazing that this course will be made available as a MOOC on edX. But in my experience, working with open source communities is really important to publish the source code, if you will, of this course, in a more accessible way, that's easy for other people to build on. Because if the only way to access this material is to sign up for the course, you know, you log in, you take the course, right. And if you want to make use of it, you have to manually you know, copy and pasted off the page, you know, that kind of stuff, that makes it a lot more difficult. So the source code behind all of this, and all of its element, I think should be published in a I mean, it's probably going to be on GitHub anyway. But it really needs to be architected well, to make it easier for other people to do to build upon. And they should be deposited in archives that will be sustainable over the long term, whether that's the Internet Archive, or the Wikimedia Commons. Those places are fantastic for long term archival of material exactly like this. So I highly suggest looking into that, as well. And I also really loved the discussion about integrating, you know, elements of this curriculum with you know, services such as GitHub or LinkedIn or other services, right. But I like to stress that in the spirit of open science, it is really important to not have any of this kinds of participation in this curriculum to be tied into a proprietary and closed source and centralized service, such as GitHub, when LinkedIn, if that makes sense. We want to avoid any sort of vendor lock in so that you will be able to participate in this 100% Without Having to register for any of these centralized and close to source services as well. I think that option is really important. You have heard this a lot. I mean, I have a lot of other thoughts, but maybe I'll let other people speak first. Thank you.

C

Chelle Gentemann 50:16

Thank you so much. Yeah, we've thought we've struggled with this. It's it's hard, right? Because they have this visibility, and it's acceptance. But yes, they are closed. So we this is something that we'll have to navigate as a group. And we will, we will provide that certification document

to you. And then again, all comments are welcome. So thank you so much. I think she was saying was next. And then Kelsey. Can you hear me? Yes.

 Qiusheng Wu 50:47

Yeah, I agree most of the comments that I mentioned earlier, and she'll already mentioned, because the gig hub, LinkedIn visibility, easy. I mean, there's also GitLab, and other alternative, but it's just not many people use it to me, I think that they want is fine. I mean, we can prefer to have loads of options that no vendor lock, but it doesn't feel you can provide multiple options. If one day goes away, I think NASA will be able to figure out another option to present those badges and certificates. So regarding the materials I was thinking about, so you'll be hosted on open IIX. But would there be also useful to create some kind of promotional videos or introductory videos and also hosts on YouTube. Because when people are trying to find tutorials, something, I think people will go and go to YouTube, rather than go to Open edX because it's just the visibility issue is the same, same thing. So maybe one, one introductory video for his course, or some module or something that it doesn't have to be long, bye, good introduction, and then people source and then they can retire to check the page description or the video can redirect the audience to the open uTec site, that might be something that we can do to increase the visibility and to increase the audience. And the second one is about the

 Chelle Gentemann 52:18

quickly, that is a great idea. If only we had a YouTube expert on the panel shochet. Yeah, I

 Qiusheng Wu 52:25

can help. Yeah, I should be able to, I can even create a new YouTube channel, if you like. And then we can create different, for example, playlists, and then you can put them there. And then we put them out on social media as in this way, we can get a lot of great idea. Yeah, a lot of attention. So you can use YouTube for the intro, and then redirect to Open edX, you can have the source code notebook, something hosted on GitHub or gig level, whatever, right, you don't have to just using one single, strictly one, just one single platform. And the other comment is about the mood, the length of the video or the the module because if you are thinking about how the academia or the university, they can integrate some of those modules into their teaching, then you might need to consider like, if I start for example, with load five components, I think right now the easiest one for I think for me, it will be the open tools and resources. For example, GitHub, teachable GitHub GitLab, Jupiter, no loads I already have a tangible resources on on YouTube and others. So I think they won't be easier to get started. Because it's not something that starting from scratch. So and just thinking about when we creating the content, how long does it take for each module? Because if you're integrated into teaching, then you need to think about by one hour, two hours, you don't want to make it like too long. Also, in terms of the module, for example, for GitHub, do you want to have just one more do you want to like have a whole course about GitHub or something like that, because just think about how they fit into the curriculum. For example, I'm teaching programming. And I'd love to adopt a module from something that NASA developed into the curriculum. But it needs to be something feasible, that is one hour, two hours, three hours, like one one week, or

just one lecture, and then have a lab, something like that. So just to make it easy for other people to adopt that the more people are using that. The more people are getting interested in open science, and then you can Yeah, just some some like

**C** Chelle Gentemann 54:38

super helpful. And I'm gonna actually skip ahead because I see that Gloria Washington has her hand up and she hasn't been able to talk yet. I want to get we're about to we have four minutes left. So I wanted to hear from her. I still want to thank

**G** Gloria Washington 54:53

you so much. I just had one quick comment in question. Um, I know you mentioned earlier different opportunities. But one of the comments that I wanted to say was that if the curriculum is available on this MOOC, are there opportunities out there for universities to propose new and interesting ways of getting it out to the public, like K 12? through high school. So an example is on grants.gov, there are all these university partnerships where you can propose proposals of different ways that you, you know, get the word out about NASA internships, or BLD internships, maybe one thing would be to possibly do something like that to incentivize different universities for using it especially HBCUs. Because we do a lot of outreach with K 12, summer camps, things like that. And I was just wondering if things like that are already available.

**C** Chelle Gentemann 55:58

I'm hoping that the resources that we're doing can be used in that way. So yes, we don't have plans at this point within the tops element to support K through 12 deployment, because there are a lot of laws around K to 12, that we haven't yet wrapped our head around. So right now, we're focused on undergraduate and above. But we have been talking to communities and groups, and we really do hope people will take this and apply for other opportunities. And we have two minutes left, so I think Kelsey was agreed more than two. Okay, so Kelsey, did you want to?

**S** Shelley Stall 56:40

And could I gone back to Gloria's point, Gloria, we have an entire education section. So it would be really fantastic to hear more about your thinking. And if there was a way for us to maybe have a guide that would be useful. I've we're open to that. We don't we don't have as many restrictions as NASA does, we can actually consider that as a forward motion. Thanks.

**Q** Qiusheng Wu 57:09

Sure. The agenda says break it one time. So I think you still have 10 minutes. Perfect, then

C Chelle Gentemann 57:14  
we can get. Okay, Kelsey.

K Kelsey Hightower 57:18  
Yeah, so one thing that was I was hoping that oh, well, I have one question before I maybe propose something. What is the output of this training? Like, if you go get train? What do you expect to start doing?

S Shelley Stall 57:31  
So interesting. The, there's a, there's a base concept that's going to be throughout all five modules. And the concept is, we want you to understand how to manage projects, using GitHub, on a Jupyter notebook with your data, and your your text and your software all combined into this one tool. We know that half of our community uses other types of computational notebooks. But we're starting with Jupiter for the initial version, and the minimal viable product for the the deliverables, the content will be developed in a Jupyter Notebook. It will be integrated into the open edX platform from GitHub, through a Jupyter. Notebook. And then, and managed version control configuration via Jupyter Notebook GitHub, and I did see the note about making sure we archive Yes, we will. And so that that's the mechanism. So you are you have hands on experience, using getting familiar with how to use Jupyter, notebooks, and then learning all of the content for each of the modules. So understanding of like, for instance, for data, the one that I can't wait for us to build, because we have, we have been challenged in countless ways of guiding researchers to the best possible scientific repository for data, knowing that the number of options are many. And there's criteria on every single one of them for who and what can be placed into that repository, and how much time you need. And the more it's been incredibly difficult to actually build something that's useful for researchers. And so by you engaging with the Jupyter Notebook, you're engaged with GitHub, you're learning these open tools that are part of module two. But then you're also learning the content of what it means to actually make the selections and decisions. So it's, it's together. I hope that helps.

K Kelsey Hightower 59:35  
It helps. So the one thing I was wanting to recommend with that additional context was, I think there has to be some type of specification of like, what the output is. So imagine if someone said open sources, applications written in Java hosted on SourceForge. Like if you've done that, then I think you just kind of zapped the whole open part out of it immediately because people would just say, Hey, you must do you know This specific way of doing anything, right, you have to just do Juniper notebooks, put them here, and that's open science. And then people start to just say, oh, open sciences, Juniper notebooks, no additional thinking need it, no one gets creative. And then people may just move on. Ideally, there's probably some higher level artifact or expectation that the science is reproducible. How do you run it yourself? How do you aggregate data? How do you pull the data permission and access to the data? So I think they're having a specification, even if it's Juniper notebook that implements that in a very tangible way. Because I think what you're going to find is, over time, there's going to be so much creativity around various tools that can output or reproduce these things. So giving people guidance,



because you might actually see the community create some very compelling training that maybe you didn't think about, or new toolset that you didn't think about. So I would probably say, Hey, what is the specification that goes behind all of this so that people can know? Yes, I'm already doing open science without even going through the training. This repository already checks all the boxes, and I think then you'll actually be able to invite kind of a broader set of the community.

S

Shelley Stall 1:01:12

That's, that's a really great insight. Thanks for that. Yes. And for those of you who've been tracking with all my slides, exactly. James, you're right, I did not give a lot of detail. So you're right, I could have added that policy. I think that

C

Chelle Gentemann 1:01:27

one of the things that a lot of people outside of the scientific community or who aren't really engaged with, it might not realize that, you know, I took a lot of fluid dynamics classes. And I took one class and list in like 1992, and that is the extent of my computer training. So scientists takes such discipline specific courses, that it's very rare to be able to access courses like Fernando's and other ones taught, where you actually start to understand the scientific workflow in a way that you at the end of it end up with a reproducible scientific result. And that's, that is the goal is we want someone who takes this course at the end to say, I know how to share my results, I know how to share my research in a way that anyone can access it. And anyone can build on it. And I'm, and that I think, is our end goal. But that's what we're trying to get people to understand how to do. And right now that knowledge isn't consistent across our community.

K

Kelsey Hightower 1:02:39

Right. And that's why I think that specification helps it might say, hey, the data must be accompanied with the schema, and that schema should be importable by a sequel, light or Postgres. But just having kind of those base things, I think you'll find that people will be able to find their own ways of teaching people those individual skills, or there's probably people that already have those skills that may want to start doing science for the first time. And then knowing that they can actually output those those artifacts.

C

Chelle Gentemann 1:03:04

Yeah, thank you for that. And I think it was a gem, then Fernando, then Hans.

J

Jim Colliander 1:03:15

So I'm really excited about this open core. Um, I'm worried a little bit about scope creep. So the emphasis here is on open, perhaps more than science in my first reading of the slides, but then this kind of corollary that shell described as the goal, where someone who goes through this

course will not only learn, you know, what is the definition of open science, but will experience the process of going through something that involves reproducibility. That goal, if it can be achieved, has potentially very significant effects around society's understanding of science, and not just the opening up of traditional science. I think about all of the disinformation that's taking place around COVID, for example, and if we had people trained in reproducible science, and they understood that this fact is different from that fact, then we have a transformational opportunity that's not just affecting the scientists that I think we're imagining or coming to the AGU events, but instead, it has a bigger impact. So there's so much scope here, and I just want to make sure that we, you know, aren't trying to boil the ocean, but we might have that chance.

**S** Shelley Stall 1:04:41

Tim, you get it. And, you know, maybe no don't join us and then boiling the ocean can actually happen.

**J** Jim Colliander 1:04:52

Yet rather freeze it.

**S** Shelley Stall 1:04:55

Jim, I think what you've just explained very succinctly is white all of You have to help us. You, we we really do need. It's that nuance that, okay, do I, you know, I don't know what open is I've been practicing research for 20 years. You know, I get myself published. I, my career has advanced. But we know that the challenges ahead of us are not simpler. They're more complex. And if we are already having trouble getting to the publications, we need to read, communicating with our local community on why all of a sudden, there's wildfires in California that are burning down whole neighborhoods, why, you know, we just watched a house go into the ocean on the other coast. Just I don't know, if you're, if you're, if you're catching that, I mean, how, how do I, as a citizen understand exactly what it means? What it mean? How do I learn about climate science, such that it matters to me and what's open for me to understand. And I realized there's a lot and nuance there, you know, research papers completely different than something we prepare for the public. But this is all connected, the more we can work openly and help our community. And this is an international challenge. Trust within scientists trust within researchers, not every country, everybody's got different challenges. But nonetheless, it's pretty around the world. How do we help the broad community realize the value of what we're doing and how we work, we're going to hit all kinds of buttons. So we're starting with these five basic modules, we're going to do them really, really well. They're not going to be complex, they're going to be very tight. So that everyone feels confident on the five modules, we will have version control will iterate, they won't be they won't. What's the word immutable, they will change, we will update them. Over time, we're thinking the first year or so will be some quick updates, the tools and resources is going to be a constant update, we'll probably have to think about how we design it. So we'll make it easier for ourselves. And then the next question is, how do we bring it into the disciplines? How do we because every researcher is like, Okay, that's great, but how does that apply to me? Listen, I've got big data, listen, I got little data, you know, come on, we have to get to that pretty quickly. NASA is

thinking about it, he has other programs of trying to get it to the discipline specific level. So I think if NASA does what they do, he does what we do. And and you'll see in a few slides, that we're actually talking to quite a lot of other societies who have other challenges with getting this kind of stuff out to their communities. You know, pandemic was not kind for a lot of societies, that if we can provide the materials just like we are going to do open, show them how to build their own modules, that they're going to see a path to provide incredible value to their researchers, such that nobody gets left behind. But you know, there's what, how many people sitting at this table with me seven, there's no way seven people are doing this. It's got to be 100,000 people. So all of you, all your networks, the fact that this is not just people who go into space, this is every single human being on the on the earth that we care about. Right? This is big. And we need you because there's no way we're doing this without you at all. So thanks, Jim.

**C** Chelle Gentemann 1:08:30

Hey, we're at our break. And I know there's a bunch of hands up. And thanks so much, everybody for this discussion. This was fantastic. You can make more comments in the chat. But again, we'll be sending a document around and you can make more specific comments in there. And we're gonna go to break for 10 minutes now. So I think Cindy's gonna put up a slide that has our schedule. We'll be back in 10 minutes and thanks again, everyone.

**Y** Yvonne Ivey 1:18:13

All right, should we give it a moment just to make sure everyone's back in the room?

**S** Shelley Stall 1:18:18

Excellent. So let's move along. I think you guys are coming back in. And the next topic we're going to discuss is engagement of the open science community, the open core curriculum development. And Chris Ervin is going to present that to us. Take it away, Chris.

**C** Chris Erdmann 1:18:49

Hi. Hi, everyone. I'm so I'm with the HU tops team and top team in general. And I'm here to talk to you about, I think, a question that's already been coming through in the chat about how so how are you going to reach out to our community, we mentioned that we're going to work with all of you because, again, why reinvent the wheel, there's a lot of material out there already. From all of you. And we're really seeking your help to build this. This, this curriculum. So the next slide is really our our curriculum development team call our call to, we're seeking. We're seeking input we're seeking really x experts from the community community members to help us with this curriculum and developing it and those core modules that you saw. So around open software and data and related practices. So participation, for in this sort of call this development of the curriculum, will be a series of virtual meetings and sprints. The curriculum modulates. It's very important that we also meet with them in person. And I'll speak a little bit about the two sort of roles that we're thinking or three, rather, two to three roles that we're thinking of here. But first of all, I'd like to point you to that to the link to where to where you

can actually sign up. And let us know if you're interested in helping us develop this curriculum. And another important thing to mention here is that we're looking at May 25 2022, to two, to really get all the sort of feedback and all the people signing up to show us that they're interested in helping us develop this curriculum, we realized this is a short timeframe. And so we're also this, this can also be maybe more of a gradual thing. So I mentioned that we're really interested in getting our leads on board. But we might, you know, also leave open the forum and you know, continue to get additional input, you know, people signing up, because we all know that it's it's just a challenge to work around our lives or other scenarios that we have in our lives. So we, we want to be as inclusive as possible. But as Shelley mentioned, we have a, we have a very advanced timeline to work with here. So next slide. Yeah, so I mentioned there are these roles that that we've outlined out here. So the first one is this lead role that I mentioned earlier, these are these are the this this role will be involved with sort of designing, curating model and facility facilitation, but also keeping in mind, all the diverse perspectives that we want to include in each module. The other thing we want to mention, and this is certain first opportunity, is that we really want to work with the people that are developing this curriculum on another role called maintainer. So I'll speak a little bit about that later. But that's really just to help move the the development of the of the curriculum, as we sort of do this initial brainstorming and content development, we really need maintainers to come in and also help with sort of reconciling reconciling and merging some of the content, we also have these content, SMEs or SM ease, you heard earlier, this is subject matter experts, that, really, that's that's where that role will be involved with sort of the, you know, using reusing material that that we know exists out there. So the content SMEs, and the leads will bring in sort of this, this content that we think is readily available that we can adapt and reuse for this for this program. And, again, they'll bring this diverse and diverse perspective scientists, scientific perspectives, life experiences, and you know, that sort of background on teaching materials or other other aspects of, of learning, that that we want to incorporate. And then also, they can also to be this volunteer that meet this maintainer that will work with our team in sort of reconciling and merging this content. So I've already gotten some positive feedback from some, some friends in the committee about the fact that we're, we're, we're actually paying, we're going to support the the lead role. So you can see here, it's \$10,000 and we'll also look at how can we and acknowledge this work, but also the the content SMEs the subject matter experts will, we'll be providing some support for \$3,000 acknowledgment, and then maintainers we're still kind of discussing about how we can support and acknowledge that work in addition to this lead and content, SME work that I mentioned. So next, next slide. So, a little bit more about the lead role. It's it's, there's a little bit more participation from this role than the content SME, so there is this in person element to that we'll, we'll be working with you you'll you'll come to Washington DC you will come to the HQ headquarters. It's very nice we welcome you be excited to work with you. And you'll also be involved with this virtual participation so that the in person work is really to help with that sort of design work that that the you know, preparing for that facilitation work. And then, you know, you'll will also work with you sort of brainstorming and providing that additional feedback from, from examples from your own work, but also working work with the community with regards to open science, teaching learning. So next slide. And I should say that we're where you don't have to go back. Yeah, we're looking for five, as you saw in the previous slide, we're looking for five leads. And then you can see here we're looking for 25 to 35. So that that's really five to seven subject matter experts per module. And I should say, here, I didn't mention it earlier for the lead role, but also here, we're looking for that sort of up to one year commitment to participation. This are, the additional information I'd like to add here is that the one year is really more to more or less to account for that maintainer role. So if you decide to volunteer and participate in that role, then that's really speaking to that otherwise, there, there may be, you know, some of the other experts may may have some are more of this upfront work, but realize that people will be really excited and invested in

probably really want to continue maintaining as well. So this is the virtual, the virtual participation for the subject matter experts has really focused on that last week and June, so June 27, and then July 1 to July 1. And really, again, it's helped with certain developing, bringing in reusing this content that's out there, helping sort of develop this core curriculum in throughout the five modules. So next slide. And again, just touching upon this maintainer role. So it is volunteer voluntary role, we do want to, you know, provide support and acknowledgement to this to this work. This, the module maintainer really coordinate some of that the feedback, that reconciliation, the merging of pull requests, working through some issues, but working with the core team, so we have people to work with you on on that. So really, that role is more about the expert, the expertise aspect of it and working with our team. And you know, so as as we continue with that work, we really expect it to trail off to the point where anything that comes through will be more or less spelling correction, anything that sort of major, you know, we'll speak to later about how we might manage that. And then, so again, we're looking for sort of five to 10 members here, maybe one to two maintainers per per module. So, next slide. So this, if you haven't gone already to the form, we do have the link here again, if we want to drop it in the chat, but we just any if you want to try out the QR QR code created, created by my colleague, Sally star, see, the QR code is really amazing here. And then so the the thing I wanted to highlight here is that we outlined what's in the form so if you haven't gone there yet, it's really looking into your background. You know, the motivations behind why you joined, join in the why you why you're interested in joining and participating which modules which module you're interested in helping with which role your availability you saw our advanced timeline. So it's really critical that we know you're available, your CV your resume, to to you know, sort of understand your your knowledge and skills, and then search teaching and training examples and we ask in that process, whether they're CC zero Creative Commons, zero, our Creative Commons BY so we can reuse that, that mirror that material and attribute it. So next slide. I believe this might be the last slide this the selection approach. So may have been wondering how so how you gonna get up, we hope that we're going to get a lot of people are submitting their interest through the form. But we're really in this process. One of the central things we're going to be looking at here is diversity. You know, we really, you know, we talked about certain going together. Well, we also we can't go together without having diversity of voices you know, people from from various backgrounds is really important. You know, if this is going to be broadly accepted, we need people from all over for it, so I just wanted to, you know, we list out sort of all the sort of things we're looking at. In diversity, I think one thing that we added to the forum just this morning, based again, on some feedback is that we're also looking for contributions from, from different career levels. And also to speak to sort of the language aspect, you know, not everyone is certain, Uber comfortable with English. And so we also want to work with you on, you know, working through the materials so that it's more accessible, and also working, you know, with us, also, as well, if you wanted to contribute, but you feel like maybe you're shaky with your English, we also want to work with you on that. So you can also see, in addition to the curriculum, the knowledge, the knowledge, the experience was related to the modules. We out, you know, we're also looking at sort of how you're working with the Open Science communities, with diverse communities with, with communities in STEM. You know, again, we mentioned academia here, but I think it's also important to note working with the public. So we're also interested in that. So that's the next thing about climate justice and citizen science, that point. And then, you know, also that sort of knowledge of of teaching of training proaches. And sort of the tools that you're using, this is something we're also looking for, in the the submissions that we're getting. So I believe maybe that's the next slide we go to. Yeah, and then it's open discussion. So I guess I, I look over to shell. I don't know, Shelley.

S

Shelley Stall 1:31:53

All right. Let me if you could, if you could pull this slide, and thanks so much. All right. Calcium. Oh, okay. James, we'll get to you next time.

K

Kelsey Hightower 1:32:07

Didn't mean for my hand to be up.

J

Jim Colliander 1:32:10

Oh, okay. I was following Chelsea's lead. And I had a stale hand up too.

S

Shelley Stall 1:32:20

All right. So share. Okay. Hi, Cher. Go ahead.

S

SherAaron Hurt 1:32:27

Hi, this is very great. Thanks, Chris. Hey, Chris, I'm listening to definitely the maintainers aspect. So I represent the carpentries. And we're actually right now in the process of doing an onboarding of 11, new maintainers to all of our curriculum. And so with that, one of the things that immediately came to mind was, what would be is their plan for the training or, you know, to be coming a maintainer? Or is it expected that there's, you know, the participants that are signing up to be a maintainer, they, you know, we I saw the selection process, but what about how to be a maintainer? You know, what type of process will go into that? I'm just thinking about, you know, someone may say, Hey, I might be interested, this is something I might be interested in, but I really don't know how to be a maintainer of what, you know, what that would entail. So just curious if there has been thought around that process.

C

Chris Erdmann 1:33:27

Yeah, I'll so right on cue. That's actually what we've been looking at is the material already available from the carpentries. Again, we realize this materials also in other places, but we also on our team, we we've been discussing this goose we have, you know, we have on our Hu team, but also the broader team, we have people that worked in this in in variety of roles, and have materials that we can leverage as well. And so you know, that that's also, you know, material that is actually, just to be honest, is still in development, you know, but if you want to that, that that's in the you know, maybe we will gladly reach out to you and our panel members to to help with that process, too. So, yeah,

S

Shelley Stall 1:34:23

just to add that, we're fully aware that if the modules don't stay fresh and up to date, and community-acceptable, that makes sense have a problem, makes sense have trust problem

community acceptable, that we're gonna have a problem, we're gonna have a trust problem, we're gonna have a continuity problem. So we know that this is critical that yes, that initial surge is getting those modules together, getting them up getting folks, the cohorts coming through. But then during that entire effort and into the future for who knows how many years we need to keep them updated. And then new comes in and and The work expands. So he is committed to the ongoing management. But we don't want to make a decision about a module that we are not an expert on. So we know we have to continue engagement with the subject matter experts to do that. And that's the maintainer role. So you can tell that we don't quite have this all worked out. So there's an opportunity to, to fine tune it. Oh, I'm sorry, Kelsey, go ahead.

K

Kelsey Hightower 1:35:29

You have a question around the practice. So, you know, when I looked at all of these modules in training, is there like someone that's already doing open science that meets all the definitions, right? Through practice, like, there's a repo that's already up? There are people who are already working in the maintainer role, there are people to draw from experience, right? Like, Hey, I've been maintaining this open science project for three months, six months, a year. And that person can give a lot of guidance on like, hey, outside of like, what we think the training should be. Here's what the reality actually is. Is there some examples to draw from that are already in practice?

C

Chris Erdmann 1:36:06

Yeah, absolutely. The one that is always on the tip of my tongue is an ad I don't know if she's, she's listening, but she'll Julia Stewart round is, is. There's an example from the ocean health index of how they worked as an open community. And really that sort of that project led to open escapes, which has been mentioned earlier about how teams can work in the open, and so they do have material they have expertise to tap into. So that would definitely be another place that we would reach out to. But that's, that's sort of always on my mind whenever that question comes up. But I know, we also, we have a number of examples. Some, you know, some of them, some of them are on this call, you saw earlier saying hi, to other people on the on the chat. But, you know, we definitely do have a number of examples out there, you know, from from our community. And I imagine that when, when we have when we get sort of the submissions from people, they will bring, you know, we hope we hope they will bring those sorts of examples with them, too. So

K

Kelsey Hightower 1:37:14

one clarification, do any of them meet the open science definition? Like do they would you say, Hey, this is open science, and it meets the criteria,

S

Shelley Stall 1:37:25

let me take that one. Because we really don't want to consider this a check mark, would really just want to encourage people to continue to improve their practice, that you completed the training, but then you have to bring that back into your world, your colleagues, your PI, your

your students, and move and help them move forward. So do we have examples of folks that have that are currently doing the best they can? I think, yes. Would we call them the top of top of the deep? Possibly? I think it would be. I think it would be more constructive to say there are these elements, some people are doing better than others in some of the elements? And I think we have examples of that. If everyone's hitting all the elements. I wouldn't want to I wouldn't want to just assume that's true. I would say no, I think I may be somebody's out of your butt. Yeah, but me but me, but me, I've done it. I've done it. I've spent my whole career doing it. Great. And certainly you might be an example. But you would definitely be unusual. I'm not sure I helped you.

K

Kelsey Hightower 1:38:42

Well, it makes me nervous, because then it can be anything, right. So like, if you're going to train people on subject, for example, if you said open source, I could probably find you 100,000 projects that meet the Open Source Definition, definition is scoped enough to say, yes, the software is available, download changes license, sometimes you can go a little further with a governance model. But open source doesn't demand a specific governance model. So it's not no requirement to be open source. So that's why I was asking you is there anything that you would say, Hey, this is like, if you got to this point, you are definitely practicing open science. And I think there's going to be some things that say, Hey, like, how do I know if I'm doing I need some checks and balances? And also, there's a bit of accountability. If you were to kind of put that badge on something to say, Hey, this is open science, but it's really not how do we tell someone Yo, this is this, isn't it? Right? I know you're striving for and we will applaud that. But you're actually falling short. Here's why.

S

Shelley Stall 1:39:41

So that's really important you want so we are going to provide badges for you completing a course, we are not going to provide some sort of validation that your research practice is open science. We should think about that in different ways. Those are there are other metrics we can use. Let me give you a few examples as to why I personally feel we need to be super cautious here. Within our Earth and space science community, we have approximately And please don't anyone tell me I'm wrong here, I'm just I'm gonna give you a round number about 300 Discipline repositories worldwide. So those are data repositories that take a particular type of data, they curate it very well. And they store it for reuse there, they're serving a particular community. There aren't enough discipline repositories in order to serve all of the earth and space science researchers period, which means many of us land in a generic repository. And that's all there is, as a matter of fact, the last time there's a lot of reason why this is true. And, gosh, I'm heading down a well, we might head into the weeds on some conversations, right. And the publication process drives researchers to generic repository because you get the DOI right away. A discipline repository requires months of planning ahead of time to get your data fully curated, such that it has the proper metadata, such that it's easy to find, and reuse. So when we're talking about Open Science, we're doing the best we can with the resources we have and the tools we have. So there are many researchers not being served with discipline repositories that could really use them. And they may not even realize that that's a thing. So this is why we're saying this is a journey. We want you to know it's possible to do this. We want you to strive for the best possible place for your data. But there are other factors that may cause you to make a different decision. That doesn't mean you're doing bad science.



Y Yvonne Ivey 1:41:45  
It, I

K Kelsey Hightower 1:41:46  
want to make sure I was clear, like a particular programming language isn't the definition of open source, right. But there are some fundamentals that the source is available somewhere, whether it's discoverable, or on GitHub or not, doesn't disqualify something from being open source. So is there like a bare requirement that the data at least has to be available somewhere, even on a floppy disk?

C Chelle Gentemann 1:42:10  
So Kelsey, I think this goes back a little bit to some of the discussion that we had yesterday about the valuation of like, how do we value open science activities? So I think with the open core, we want to teach a baseline of what open science is, I think the conversation that you're starting, though, is incredibly valuable, because this is where agencies that provide funding and create incentives can step in to say, this is what we feel is open science. And this is what we're requiring for our funded projects. And NASA has a really greatly named information policy that is SPD 41. A. And it's, it's, this starts to this is what Steve Crawford has been working on to outline what are the expectations around data around software and around publications for NASA funded research projects. And we will continue sort of narrowing like fine tuning that definition of open science as the community starts to develop knowledge. But right now we're faced with a situation where if we ask people to tell us what software license they're using, that might be a non starter for 50% of our community, because they don't understand what a software license is, or how to apply it. So I think there's two steps here. The first is this baseline understanding, which is what open core is, and then the second line is for the agencies to with the community's input, start to develop this concept of what do we vet What activities do we value as an open science community? What activities contribute to open science? And how do we reward them? And it's hard because there's lots of different like you said, like, open source, I can name you know, a lot of people who can help you with that, but what about, you know, creating a reproducible, publishable notebook? What about data, whether it's on a cloud? So it's, you know, is that more valuable than in a repository?

K Kelsey Hightower 1:44:20  
I don't think we should ever get that granular. But should the data be available at all, like an in any capacity in which you choose? Is that a minimum requirement? Or I guess a better question, let's say my data was explicitly not available, would that meet the open science definition?

S Shelley Stall 1:44:39  
So it depends. Are you hiding your data? Or is your data including health information, and that

should be protected? Like, are you telling me as a publisher, I can't give you my data because I didn't take the time to put it in a repository. The publisher will push back and say to you, well, then I'm not going to publish and then you go, Oh, hang on all do that, which is an entire cycle we're running into, right that that's like a real thing where others had no idea they needed to do this. But if you come back to me and say, Well, my research is on the health implications and such as such atmospheric conditions, and we go, oh, that's health data, oh, that needs to be protected, then, here's how you handle that within a data availability statement, here's how you would cite that. So there's a there's a lot of very nuanced detail when it comes in very explicit detail, when it comes to what type of research what type of data and what services are available. Like for another one. There's so there's pelvis, folks that are dealing with petabytes of observational data. And they don't have a NASA repository or NASA funding in order to have access to repositories that can handle that size. And they're left in the dark, because there are literally no repositories can handle that size anywhere. Okay, someone's going to put one in here. But thank you very much. And that's highly unusual. And all of a sudden, you're not in a repository where you can get preservation services and citation. But now you have to use something like an FTP site, or some other type of non preservation repository. But that's because that's all there is. There isn't anything else for you, you don't have another option. So we want to help people realize that they need to do the best they can with what actually exists for them and their research.

**C** Chelle Gentemann 1:46:30

And I am going to jump in here and say that we have a whole team at NASA Headquarters working on policy development around this for NASA funded activities. And I know that other federal agencies also have teams working on this. So there will be guidance coming down from funding agencies, about what we consider to be open. And that will give a baseline for researchers. So now we have the, you know, people creating content so that they'll understand what it means and funding agencies, you know, detailing what they value.

**S** Shelley Stall 1:47:05

I lost track of the time that I Fernando is next and then Malika.

**F** Fernando Perez 1:47:12

Thank you, I actually want to briefly comment on this discussion, because it's a topic that in a sense, I've covered quite extensively, or when I've taught my course on reproducible research with the students because that very similar conversations arise around reproducibility. And I think it's, I find it useful at least and perhaps others, others may to think about it not as a binary but as a as a spectrum and a spectrum that has more than one dimension, right? And science is neither closed or open. It's not reversible or irreversible, there's degrees. And there's reasons where and why. For some, for some research, it may be very easy to do end to end for others. Maybe the hardware isn't available, maybe it's based on a supercomputing run that required the nation's largest machine at Full Tilt for a month, and nobody can can reserve that etc, etc. But there's ways to capture, understand what is the principle? What is the goal, the goal is not to get a badge that the science is with poseable check. The goal is to ensure trust, participation, robustness of the results, the ability to build on it, and how can we get there? Well, I can't give you a whole bottle run. But maybe I can give you a reduced model run that

gives you trust in the data, maybe I can't share the data because it has PII. But I can give you a synthetic data set with similar statistical properties so that you can validate the algorithm and understand what I did, etcetera, etcetera. So if we, if we present the principles that we're after, which I think is the idea behind behind the teaching this knowledge, I completely agree with, with Charlie's point that we don't want to get into the business of certifying open science, but rather, these are the principles and you will have to embody those principles according to the constraints of any given situation that you're in. But if you do understand the principles and are kind of in good faith, trying to follow them, then you will find solutions to to what whichever set of constraints happen to apply in any in any circumstance. So at least that's how I frame that discussion with my students. And I think we've been we've been successful, to some extent, but but I also did want to ask a little bit of how you've thought this is also based on on my teaching spirits, what have you thought, from the perspective of the program, and especially of the skillet, which has been framed about doing more hands on project specific work, topic specific work, because I teach this course on reproducible research with about 70 students, but I've also taught courses with about 1200 students at Berkeley in data science. And I have tried to embody those very big courses with more detailed projects that are kind of in this spirit and a simpler way but, and that was a nightmare, because the amount of bandwidth required the pressure, it puts on ta teams, etc. I just, I mean, I just killed my whole team. It was kind of a mess. And we're kind of recovering from that. In the smaller class setting, it works beautifully. But it works beautifully, because we can, the TA can engage with the students one on one. And the students get to live these ideas in a wheel setting, right. And specifically, they got to live it with shelf, most recent paper before chambray is going to work on GitHub, they got to reproduce one of her papers, right. And it was about California heat waves and, and their impact on California climate. And so if these were California, students who were worried about their climate, right, and they got to get her data, they got to see her lecture, they got to pick up her scripts, and they got to build off her MATLAB code. How do we started with modern tools in an open science setting, the experience was phenomenal. But that is a very hands on problem that I don't imagine replicating easily on an open edX, it's just too demanding in terms of bandwidth. And I'm wondering if you have any thoughts on this,

S

Shelley Stall 1:50:51

my first thought is Fernando, I think that's what we need to promote, like, here are materials, you know, here, we can try to help you find a use case, here are ways you can make this real for your students. And engage people like you to do that, to take it forward into that very personal situation. What what we do realize, we have to do the best we can is create a community of support. So we're talking about different ways of doing that within the tools that we have in front of us. And he might be able to help with some of the other projects that we're working on. To create that discussion space. We there's a this is it would be an interesting thing for the panel to engage in. We believe these open core modules will get us to a common understanding broadly for any, any researcher. But the moment you ask the next question, the discipline specific question, you all of a sudden have to get very specific, it's a quick run to the weeds. If there's not middle ground, it's okay. That's the concept. How does it apply to me? There's no middle. And this is what we've been seeing the last few years you're experiencing, you just ask the question. So it would be fantastic to talk about this, especially within the panel. I know cells thinking about it specific for the sciences that are at NASA. But then how do we actually do that? Broadly? Like how do we, how do we bring that kind of content? Beyond NASA Science? How do we? I don't, I don't know who's online. So NOAA science, and SF science. And they're each Science Department of Energy. FDA wants to guess I'm just going to the annual European Commission, Australia. Hey, guys, I think we could do this, I think we could come up

with a way to you know, here's a pattern, here's the kind of thing you build. This is how you help your researchers with some sort of a formula and an ending and we build this out. It's not the seven people in this room. It's got to be those invested in understanding that open science is so valuable to researchers to take the message to where it needs to be at that discipline level. Yeah, Northstar, yes, sir. Hold on. Yeah, I I've not been able to read every single chat and go, that's what I'm going to do tonight. I'm just gonna, I'm just gonna hold it in my hand and go, Oh, these are so awesome. So please, I Okay. Shell. So we ideas that folks want to actually get into the rhetoric and consider these are pull requests on our GitHub, right? This is what we're asking. Correct. Okay. So so we want to capture the things you're saying, yes, the chat is fantastic. We won't lose it. But if you have specific things that you want to include, get, get that into the GitHub.

C

Chelle Gentemann 1:53:49

Well, so there's, there's two ways, I think, first with the panel, what we're asking you is we're going to be sending you a Google doc to add additional comments on. And so that'll be our first sort of summarized, like response from you, I think, and then we will sort of synthesize that update our GitHub, because all of our documents are going out on GitHub, everything's public, and we're not providing you with any secret information. And then once we start to synthesize and update your feedback, then we'll let you know, you know, everything's up on GitHub. Keep making comments, discussions, and we'll build this together. And I do I want to call out the people who've been doing pull requests, both yesterday and today. Thank you very much. Are the slides not open? The slides are on Zanotta? I believe.

J

Jim Colliander 1:54:45

I'm referring to for

S

Shelley Stall 1:54:47

your next if you would like to take over? Yeah,

F

Fernando Perez 1:54:51

just updating them. Sorry, as you asked that I was changing the link. So it's fixed.

M

Malvika Sharan 1:54:55

Thanks for Yeah, I really want to emphasise, first of all, acknowledge that it's great that in the panel, there are people who are very much about give us direction and give us exactly what we need to do. And I want to be that I don't want to be that person, I want to come in here and say that we want cultural change. The ultimate goal is the cultural change, any step towards openness is open. And also places where we actually identify why people are, for example, Kelsey, you said, What if people don't share their data openly? Is that open enough? Yeah, if they shared their software openly, properly, that's open source software, let's come to data and

understand why you haven't been able to share it. So really applying that pedagogical mindset of the carpenters. acknowledge and applaud and celebrate what people are already doing. And use the opportunity what they are not doing to understand why they're not doing what is the problem? How can we solve it? How can we have a dialogue where they don't feel demoralized? Because I feel like, we are not the first people in open science, open science has existed for several years. And people are jaded because half the community feel excluded from that conversation. And the reason is that there is always put so much emphasis on expertise, that if we are doing all of these things, then we are open scientist, and I really don't want that to happen. So I really want to, you know, focus on culture change, let's try to build that critical mass in NASA or worldwide where, you know, most people understand in a simplest form, what open science means. Also, what Fernanda was saying, really, you know, open science is quite weak. And I really appreciate shell, you have already yesterday said that NASA will be focusing on accessibility, reproducibility, and inclusiveness. And that's a really great that guidelines, or anything you would do towards these three things are really successful at work. And I really want to also say what Logan was saying, you know, it's not. And also Fernando, all of you are saying, it's not really about bad, it's really about recognizing that people are doing good work. And framing the Open Science in the form of that it is our moral responsibility to be open, transparent, fair. You know, people want the research call quality to be high and open. Research actually brings that because it allows people to look at what you're working on feedback and this pull request, you just mentioned, shell, it's just an opportunity to say, Yeah, we make mistake, and we want people to collaborate and correct that mistake before that mistake impacts anybody negatively. I had some thoughts on incentives where I think I'll wait for that. Doc, sorry, document to comment on it.

S

Shelley Stall 1:57:39

Thank you. Thank you very much for that. Monica.

C

Chelle Gentemann 1:57:45

I want to build a little bit on what Milby could just said, and I think it's something that we kind of haven't recognized in our conversation so far. And that is that I think, a lot of the times and even when I started open science that I equated open with equitable. And that's not true. Right? Open Science doesn't make things equitable. And the open science community has had a history of rebuilding our frameworks to model the way things were before. And just because we make things open doesn't mean it makes it equitable. So when we ask questions about like, what makes things open or not, we're put we're putting ourselves in that old framework, you know, that old framework that we know, isn't equitable. And so we have this opportunity to rebuild the way that we do science. And we have to keep that that in mind of like, let's, let's break down those barriers. But let's rebuild it in a way that it truly is equitable and making things open, for example, if you if you're making things open with, you know, gold, open access, that's not necessarily equitable to someone where the article processing charges the same as somebody's salary for the year. Right. So we really have to think about moving away from those old old models. And so one of the things that I think could be you know, actionable is that when you're you're doing funding proposal, don't say, Well, this qualifies it open science, you could say, these are our requirements, but don't equate that with this is what qualifies as open science. And on the theme of of just equity to hopefully also something actionable. I took a just a brief look at the application for the curriculum development. And I don't know if I saw

that but be really explicit about if it's open to international participants, as somebody who has immigrated twice, knowing whether that's open to me and whether it's legal or whether it's like legal for me to be to participate in this, if you want those people to apply make that obvious. Thanks, Monica. We've had a we were just having this discussion, I think, a day or two ago where we're like, you know, sometimes open means open to exploitation. And there have been a lot lot of cases where people's own data have been used against them in ways that weren't equitable and more how we want open science to be. And that's part of why we're adopting this as open as necessary as, as open as possible, as restricted as necessary. And we want to be really want to be really cognizant that we don't take existing inequalities, and just reproduce a new open world that has some of the existing inequalities just maybe on the cloud this time, or, you know, maybe with an open license, but then nobody can afford to publish who isn't at an r1 institution. And so, you know, as a funding agency, we can we can put some of that into our budget, we can make sure that any funding announcements that we do, we asked for this to be explicitly budgeted for. And I think, because of the HU has a big role to play as a publisher and as a society here, and they do a lot of work in this area. And I just wanted to do you don't have to unmute yourself, because we have this I'm

 Chris Erdmann 2:01:06

sorry, that that was a natural reaction knee jerk reaction. So yeah, I just want to say that we were also trying to improve this this morning. Thank you, Monica. Like we were we were, we were getting some initial feedback about some of the things you said about, you know, just language that we can include to signal, you know, that this is an equitable process. And it's just one of the things is we we threw a lot of content into that form. So we believe that, you know, like, that was the place where we wanted to really have everyone sort of read up on the project. And within all that content there, there are like things where we were speaking, I think what you're, you're saying, but it might be buried a little bit. And so, you know, if you if you had ideas you had sort of feedback on which things we sort of could elevate and highlight, you know, just sort of signal. Let us know, please like, actually, Laura and I are right next to each other, looking at it, looking at it right now and seeing where we could do this better. So please, please let us know. Yeah.

 Chelle Gentemann 2:02:08


Chris, do you want to put out a link to the

 Chris Erdmann 2:02:10

form? We did? But I think it's buried in the chat. Okay, we'll do it again. Yeah.

 Chelle Gentemann 2:02:15

Chris is talking about a form that he sent out.

 Kelsev Hiahtower 2:02:18

Kelsey Hightower 2:02:12

I have to run out one more question. Sorry. For someone who's not in the science, a lot of this feels very ambiguous, you know, like, so when I think about data, I've seen examples of data, like my bank has data, if I go there and say, export to QuickBooks, I can now think about all financial institutions ability to support QuickBooks. And, you know, there's kind of this standard from practice. So someone coming in from this from the outside. And, you know, the spectrum is, I think, clear to you all that do this work, right? You know, where to start, you know, where the good examples are, you know, some of these requirements, but from the outside, a lot of people may not know what these restrictions are examples of like, if you are given this restriction, how do you get to yes, right. What is the example of a project that has like scrubbed the data? What does it look like? What tools do they use to scrub that data and stay compliant while also allowing reproducible research? So if you hear me asking for more examples, it's that, you know, there's going to be an average person that will come to this and say, how do I identify these things? Or how do I help? And if you if it's too ambiguous, if it's too, I guess, without examples? How about that, without examples? I think most people will continue to feel lost, like I have no idea how to be involved in something that is, you know, such a high level thing. Are there some concrete examples I can touch? And if I identify a project that's doing science, and they want to do something, you say, Oh, I have an example to draw from, I can get you to maybe that next level of openness in this spectrum?

S

Shelley Stall 2:03:58

Yes, you are, you're reflecting the sentiment of a significant number of our researchers, even in these disciplines. They they don't know if they're doing open science. And, you know, how do I how do I know I did a good job. So I am very glad you said that. And also giving us context for your questions. Examples are key. I think we can do that. When one of the problems with an example that we just have to watch over for all of us is the moment we give a paleo something, example than any researcher not in paleoclimate or whatever. The Oh, that's not for me. That that can't use that example. That's not my example. So we just have to be careful on what examples we're choosing and how we're presenting that because the moment we pick a discipline We have a problem with our content. So we just, we just all have to work together and how to keep it as easy to navigate that as possible. The flip side of this is when we do give these, we could probably do a call, for example, across the disciplines, and have a way for people to see themselves. Oh, this is what it means for me to, like, for instance, within the earth and space sciences, there are not a lot of repositories that specialize in preservation of models. What does that look like? And the ones that do specialize are amazing, the the number of services that they provide in the amount of support they provide is absolutely amazing. So in order, you know, if we're giving examples on certain things, we, you know, I can see as giving, you know, this particular community has certain resources, these guys have different kinds of resources. And these guys are these people have different kinds of resources. And I could see us giving different sorts of recommendations based on attributes of the type of research, like for field work versus satellite, people using satellite data, very, looks very different.

K

Kelsey Hightower 2:06:18

So it sounds like context and case studies that go with the examples, right, here's what this is doing. Here's why we were able to do that. Right. So that context may help you understand, oh, there's going to be some significant investment to get to this point. Yeah, got it. Thank you. That adds a lot of clarity.

 S

Shelley Stall 2:06:33

Yeah. Or I think it's going to be significant. But oh, what they showed me is actually really easy. This is this is where I think a lot of researchers are, oh, that's hard. I don't know what it is. That's hard. It's not going to help me get published. I don't want to do that. And don't know it's not hard. And yes, it may not get you published, but it will make your work be much more accessible to other people, increasing the number of collaborations and potentially citations. And oh, by the way, you'll be open and helping far more folks than you realize. So I think we just have to connect those dots. But thank you so much for for coming back to that topic. Yeah.

 Y

Yvonne Ivey 2:07:12

Speaking of connecting the dots, I think, let's give ourselves a another 10 minute break. To run grab liquids or or maybe take a bio break.

 i

2:07:23

Wonderful. Great. Thank you. respond.

 Y

Yvonne Ivey 2:19:03

All right. I think we're coming back from break right now. And we're about to jump into our next topic, which is testing, management and maintenance of the continued engagement, community involvement of the curriculum. And I will toss this over to Shelly.

 S

Shelley Stall 2:19:22

Great. And I'm just going to toss it again over to Laura, Laura Lyon, who's our program manager for the leadership within an ag and more if ag folks are listening, yeah, you know, it's more, but for this for this particular conference, we're just gonna take that one title. Go ahead,

 L

Laura Lyon 2:19:40

Laura. Today, I'm wearing my data hat. So Alex, that passionately. Hi, everyone. So as mentioned, my name is Laura. And I'm going to go over really quickly how we're going to take this to the rest of 22 and then beyond. And we only have a few slides. So we're gonna have a lot of time for discussion or you get to take a nap. So Hi, I'm Chris just went over how we're going to get our subject matter experts to develop our curriculum. Once our curriculum modules have been developed, we need to test it to see if this is actually useful for people learning about open science. So what we're going to do is we're going to sort of bring together a group partner that existing targeted early career researchers, and we're going to have them test several modules. Like the other roles, there is going to be participants support, since they are giving a lot of time and feedback to make this a better item product. And then they're



gonna go through and test content from the curriculum and the books that we're using in the courses. Additionally, as people take the course, so we're gonna use learning, data analytics and aggregate, I'm not looking at individual learners, but sort of use that to identify potential bottlenecks, and areas where we can improve the curriculum and the modules. Next slide, please. So Chris mentioned this a bit, we do have our maintainers. So they're going to work really closely with the AGU tops team to sort of resolve any issues or discrepancies with the modules. And this will be for about a year, correct? Yeah, this will be for about one year. And this is just to keep things efficient. You know, we have large groups of people working on these modules, we don't want people spending a lot of time sort of going over these trying to resolve issues. So we're going to just have these main maintainers, to sort of just oversee that process and keep things moving. And, as always, they'll definitely get credit for their contributions during the development work. Excellent.

S

Shelley Stall 2:21:45

So just to add on to that, we realize maintainer role will need to persist beyond a year. But we just want to be realistic. This is commonly a role that folks can get burned out on. And we're just going to be really cautious for how we do this. So certainly feedback from the panel will be valuable on on that on that particular. You know, how are we approaching. And we talked about this a little bit before, but I just want to recognize that maintainers don't just disappear after a year, nothing happens. We just don't want to ask too much.

L

Laura Lyon 2:22:16

Keep it manageable for everyone. And so then moving forward, your wife, as we've mentioned, we're doing our curriculum development deployment, we have our sort of development sprint happening this summer, as I mentioned before, for our testers, that's going to come in July later in the summer, early fall. And then we're going to have our trainer trainer event later this fall for the for the testers, and we're sort of hoping to use early career researchers, because we want to sort of start creating open science advocates. And since there will be a lot of students using these tools, we think that perspective is really valuable. But that is also something that we would really like feedback from the panel, you know, what groups to engage with, who to reach out to are sort of looking at societies and universities at the moment. But we're definitely open to feedback on where we can find sort of interested people. They don't have to be open science experts per se, we do kind of want a diverse group of people who are really engaged in open science, open science community, and some people who maybe come from a research background. And they're sort of new to the whole open science scene, because they'll be more similar to the kinds of people that are sort of using the modules to learn about open science. If we go to the next slide. Um, the text was on the last slide, but I'll just say it now. Sorry about that. So then, after your one, at the end of the year, we're going to have the AGU fall meeting in Chicago and online everywhere. And this is where we're going to work with NASA to kick off the year of open science. And we're going to sort of get Pop's going here. But then moving forward. And if you hit the next slide, we're going to take this on the road. And we're going to sort of go to different conferences, engage with different societies and promote tops, hold workshops, have people sort of engaged with the curriculum on the spot. We'll have people supporting these workshops and sort of like open sessions for people to work on the tops curriculum. And these are just a few of the societies we've started conversations with. You'll notice there's a lot of A's a lot of GIOS. So we're hoping to expand this beyond the United

States. Take it International, of course, and definitely beyond the geosciences. And this sort of applies to the modules too. We don't want this to be specific to NASA programs, geoscience. We want this to be across all of science. So this is another opportunity for people to engage give us feedback, we would like to know sort of where to look, perhaps other conferences, we need to think about other people we need to talk to, and really make this a sort of global big scientific effort. And then for the last slide other things, just discussion. So yeah, any thoughts ideas? I haven't looked at the chat if there's anything here. And yeah, we welcome your feedback.

**Y** Yvonne Ivey 2:25:08

So I think it's one thing to know, you know, looking at the previous slide around current ag partnerships and engagement opportunities with partners. We are however, sort of really leveraging the relationships that our NASA scientists have with their aligned domain specific organizations, so professional societies, but also the smaller societies and associations. And so although that screengrab has lots of incredible current partners, we are in conversation, so a lot of folks who have not yet officially come on board. And so we do want to ask folks that if there are groups and teams you're working with, please connect us with them. Whether that's through sort of our discussions on on GitHub or just shooting us an email, or dropping in the chat here. We've are in several different meetings already with groups. You know, I think Lauren earlier mentioned that she's at a conference right now in Atlanta with our you know, OpSec con, so we have not our geosciences specifically in that meeting, but we have our planetary and biological physical sciences team. So we realized that we have all of the science domains working together, and I think this is going to be truly a an exciting adventure to embark on together.

**S** Shelley Stall 2:26:48

Yes, indeed, do you mind bringing down this pipe? Right, let's, let's see what you guys are all thinking. You folks are all thinking, trying to stop saying guys apologize for that. I think Fernando, Fernando, is that is that a fresh hand? Great. Go for it.

**F** Fernando Perez 2:27:09

I really wish WebEx did what zoom does, which is further up hand icon is bigger and yellow. And second, it automatically sorts at the top for people who have raised their hands in the order they did. So it's very, like, that's what computers should do. We shouldn't have to think about

**S** Shelley Stall 2:27:24

eating our challenges here.

**F** Fernando Perez 2:27:26

Yeah, I do, I do. I've been watching you. And I've realized how tricky it is. And WebEx could

mean, I do. I do. I've been watching you. And I've realized how tricky it is. And webEX could make it easier for you. But anyways, that wasn't the point of raising my hand what I was, I was thinking, reflecting kind of, after your presentation on something that was asked in the earlier session regarding kind of edX integration and vendor dependency talked about LMS analytics and whatnot, and at this organization to A to C, that Jim and I kind of represent this nonprofit, we try to encode some ideas around avoiding vendor lock in and and openness in a specific context. In this case, it really was about cloud infrastructure, right. But in in this document, that's called the right to replicate, as a way to encode how to avoid vendor lock in. And I could imagine using this as a concrete, very concrete tactical guiding principle for your development, that would basically say, these materials will exist in edX. And that's where we have access to certain analytics that we need. And we have access to for example, badging and whatnot. But they will always be developed in a way that the customer, the user, the community, can do the following. The version control repository can be cloned in let's say, a generic, open Jupiter hub instance and can be used as is and yes, certain things won't work. But yeah, the edX integration will work. But if you have that as a guiding principle, that and you embody it into like a technical check, basically, is there a hub where that can be replicated? And the content still works, where the materials still work? Then I think it will, I think it will create a lot of goodwill in the community towards understanding why does there needs to be a aspects of it that are more tightly tied to your infrastructure and platform, while the bulk of the content exists in this way and it gives you like a concrete both principle and practical check that you can that you can do to draw that line, what is the part that depends on certain infrastructure? What are the parts that are generic and independent that I can take on my own? I hope that helps

S

Shelley Stall 2:29:35

in terms. Thank you very much. I look forward to looking at that document and and talking without further. Yes, thank you.

L

Laura Lyon 2:29:42

I think Penryn.

S

Shelley Stall 2:29:44

Jim did

J

Jim Colliander 2:29:50

thanks. So I want to bring together the discussion about the smees and some threads that were running through the chat. It really builds on some comments that the Ryan Nosek and Fernando made in the earlier session. So imagine that the open core was completely built. And you presented it to say a group of social psychologists, I'm thinking about Brian in particular. So there was a crisis, maybe there's an ongoing crisis of reproducibility in social sciences, maybe in social psychology in particular. And I think Brian, no six done remarkable work in trying to address that reproducibility crisis, by encouraging people to post their hypotheses before they

write their paper, and do other things like this. So I wondered if there might be a way to use the generic open core as a first contact with specific science communities, and then ask them for how this should be adapted and customized to do effective science in their way in their context. And it could come with a request for nominations for subject matter experts to develop adaptations of the open core specific for their use. So the tactical suggestion is that maybe the hiring of the main content developers and the SMEs should be staged, so that if you first develop the open core for a road show, you can then go out and show it to communities and ask for SMEs to customize and adapt into their specific communities.

S

Shelley Stall 2:31:29

I really liked that we have, if you look at [reshare](#), [data.org](#), you will see a seminar series for societies that we ran on data sharing. And of course, we talked about other things, too. It was meant to bring awareness across not only Earth and Space Science repositories, but also not repositories, societies. But we partnered with a number of others, experimental biology, brain and behavioral sciences, chemistry. And this, the awareness that came from we started, we started the work with the collaborative team in 2019. And at that time, my understanding within the social sciences is that for those journals, the editors would not even say the word share. Like that wasn't okay. They would not do that. And following that engagement, Marcia nuts spoke there, and she spoke again, they started to work on and we might be able to actually get somebody to talk about this publicly. And I'm not saying names because I don't have permission to talk about it publicly. But they they started to work on it. Very, very small. Why? What what, what is the challenge, you know, the legacy challenge that's in your head? What's What do you think is going to happen? What needs to be in place? protections for the data? How do we make sure that aggregation and D identification, it protects the patients, or whomever, and they were able to actually get past the initial issue with the word, that doesn't mean they got happy, but they were able to talk? And it makes an awful lot of sense to get a perspective, especially from, you know, coming out of the natural sciences and other types of sciences, I would be absolutely open for doing it. Yeah.

J

Jim Colliander 2:33:30

Just two quick follow up. My My partner is a social psychologist. So I'm kind of aware of this reproducibility crisis that Brian and others have really helped to, I think, yes, yes, psychology as a discipline was kind of under threat. And so an aspect of what I think of as the Open Science movement, this effort to try to change expectations from journals in order to create more valid science to improve the quality of the science from that discipline that took place. And so there's this other return on investment here. The emphasis on open, as opposed to science in our conversation, I think needs to be addressed. We are improving science through a collection of attributes that fall under the realm of open, but each discipline might actually produce better, higher quality science, if they engage with tops and do this kind of thoughtful work on how their discipline can improve and become more reusable, more inclusive, and so forth. And so it's an opportunity to engage with the societies to actually think about the merit of the way that they do their work and improve that through these. This collection of things that we're calling open.

S

Shelley Stall 2:34:53

I really love that I I don't I don't take the time to go look, but there is at one of our grants that

we have at the National Science Foundation for some of the work we do within publication and data citation, is our program officers Martin Halbert. Martin, I'm just going to call you out, man, if you're not on, I hope you see this recording, I'm gonna send it to you. But this, this goes directly to some of the things that he has been so deeply caring about, how do we actually get discipline specific understanding in a way that makes sense. And that the Pharos RCN opportunity that just came out and closed last last month, was his work across all the disciplines at the National Science Foundation. So I, it will be very interesting to see who those awardees are. And try, you know, maybe take this work at NASA and connect it to some of the the other efforts happening at the National Science Foundation or the NIH or elsewhere. That would be a really cool conversation. I'd be up for that. Yep. With, of course, outcomes, okay, cool conversation, let's say this a little differently, it would be great to invite folks from these different disciplines to come to the table, share with them what we've done, and invite them to build upon the work in a way that's meaningful for their researchers, and see if there's a way that we can support them moving forward, and able to get some, some velocity and momentum within their own communities. But of course, they have to recognize that they're, each of their communities has its own culture, its own way of doing things. And we just have to be respectful of that. Oh, it's waiting for somebody to call a name. And it's me. Then one, I think your next.

P

Pen-Yuan Hsing 2:36:53

Thanks. Thank you. Oh, yeah, so I have a quick comment followed by a slightly longer one. That's okay. So the quick one is, in response to what Fernando was talking about earlier, specifically about vendor lock in. So we talked about examples, you know, like Jupiter and those things, but on another level are the tools with which we, that we use to collaborate, right? We're using WebEx right now. And I mentioned zoom, we're using slack for the chat that we're doing. But there are also, you know, open source replacements for all of these tools. And I think that's a worthy part of the conversation as well, depending on this blue button that is extremely powerful, that can completely replace WebEx and and it's completely open source. And I think it's worth keeping this in mind and also discussing in any sort of curriculum like this. So that's the quick comment, and I have a bigger comment. And, and, and please bear with me, because I think it touches on a few things that we talked about. So I'm going to do my best to tie it together. So, so so so so I think what this common is about a three in response to what I perceive as the desire, right, for broad community involvement, and their continued engagement in all of this, and how and what the role of non traditional and non institutional practitioners of science play in all of this. So allow me to give an example. So I come from a very academic scientific background. But in more recent years, I've worked very closely with grassroots citizen science projects, in one example that that really inspired me recently is that there is a citizen science project started by Palestinian refugees in a refugee camp in Lebanon. And they were faced with a situation where they don't have access to any maps of their refugee camp at camp. And it's really hard for them to proceed to a camp and manage their communities. So they learned from other citizen science initiatives across the world. They designed and built their own instrumentation to map their entire refugee camp, they collaborated, and they produced a first public map of their camp, and allow them to completely reimagine how they make use of their space. And I talk about this example because first of all, they are not associated with and this are certainly not directed by any sort of, you know, traditional scientific institutions. But in my opinion, you know, they're practicing science for a particular purpose that's really valuable for them. On the other hand, there are a lot other female academics I know who might say something like, Oh, they're not doing science, you

know, they haven't answered a scientific question. Or they, you know, did their work will never be publishable. Right. And I talk about all of this is because I've seen a lot of open science curriculums and courses and all of that. And, and they would, you know, say something like, you know, Hey, these are great open science practices, these are things you should do to take you further along the open spectrum. And there might be a huge part of the curriculum that talks about, this is how you do open science, you know, publications in journals, and, and that kind of stuff. This is how you do gold or even diamond open, open access. But, and I don't want to speak for them, but I'm just using it as an example. But if someone from the citizen science project, they see a course like this, then they might be like, oh, so are you saying I'm not doing open science? If that makes sense, right? Or if I'm not even doing science? And, and, and I talk about all of this, because that also ties to what Jim mentioned earlier, which is the possibility of scope creep, which is, how diverse of a community do you actually want to include in the conversation around developing this curriculum? What kind of boundaries should you set? And then within those boundaries? How do we avoid coming across as excluding certain people who might be doing very good science and very good open sights. Now, in my opinion, it would be great, I think, actually essential to involve, you know, these non traditional actors, at least to get their feedback and critique on this material, so that at least it doesn't feel exclusionary. But I also acknowledge Jim's concern about, you know, scope quick, so sorry, for scope creep. It's getting late in the day for me. But um, so maybe at some point, you know, the beginning of the school curriculum should state clearly, this is our target audience. And we acknowledge there might be more diverse audiences out there, but that might not, you know, be what we're specifically aiming for. Right now, if that makes sense.

S

Shelley Stall 2:42:29

Really excited about what you're saying? Yeah, I saw a, you did see our incredibly aggressive schedule. Let me talk about that for a second. Because I know all of you are like, Why Why Why so fast. Much of it has to do with being ready to introduce the modules and get train the trainer in place before the year of open science starts. So we are, we will have a balance that will be challenged with how many people how much content, how many revisions, how much feedback? So we know this will not lend itself to a perfect situation. How, you know, no software, no development ever does. But But I think, based on you know, coming from your comment, the most important thing I can say is we are absolutely committed to ongoing feedback. And what I can imagine I'm looking over at Yvonne and chelle I know they are engaging with different types of communities. And I think maybe one of the activities we could do with those communities is like a review or an opportunity to discuss and make sure that we have those voices included. Ah, ah, and additional information that he gave me is apparently that's an upcoming topic and one of your panels.

P

Pen-Yuan Hsing 2:43:58

Oh, okay. So I jumped the gun on that. But but but thank you for your response. And sorry, I'm nitpicking a little bit. But you mentioned balance. Just now I want to challenge that a little bit, I suggest the word trade off might be a little better than thinking of it in terms of balance. So that was a nitpicky thing, but I just want

S

Shelley Stall 2:44:19

to treat you right trade off is better, because it's not just two things. Right.

P

Pen-Yuan Hsing 2:44:23

Exactly. Yeah. And, and the word balance also implies a linear relationship between the two things that you're allegedly trading off, but sometimes it's not a linear relationship. And there could be Win Win situations where you're not losing one, you know, for the other. So just just picking Sorry,

L

Laura Lyon 2:44:44

there is a I might just add, I think one of the strengths of Hu being a partner here is that we do have our thriving Earth exchange project. And one of those new initiatives that we've been working on is the community science exchange. And one of our close partners is actually the Citizen Science Association. on that initiative, so we have really good connections there. And I think, you know, bring this to the broader group of, you know, outside of traditional academic scientists is something that will make this program a lot stronger. About our new German. Yeah. Okay, go ahead. Okay, well, surely, hopefully you share her about the new journal. So we do have a new initiative on it's called committee science exchange, I think it touches on some of the things you just mentioned is that it sort of has two focal points. One is a traditional open source or open access Academic journal, but the other were the unofficial or is underneath, but it's sort of non traditional way for these community groups to share information that's outside of the academic publishing process. So a lot of the questions we're sort of working with are like, you know, publishing in a journal as a community member, there might it might be a lot of work for something that we as academics might get a lot of reward for. But you know, it's not really something that pays off for someone who's just trying to solve problems in their community. So we are sort of thinking about how do we free things or useful for communities? How do we engage them? Thriving Earth exchange has an amazing job with like co creation, co development of science with these communities. So you know, I'm super interested in continuing this conversation, on having dialogue with

S

Shelley Stall 2:46:15

you, folks that you know, that Palestinian refugees would be part of the refugees in Palestine, right? Palestinian, maybe I'm not sure why

P

Pen-Yuan Hsing 2:46:24

they're Palestinian refugees, but they're not in Palestine.

S

Shelley Stall 2:46:27

But they would be certainly well. And that's an amazing story. You also mentioned synthesis science. And one of the we have a partnership through a grant with the Belmont forum, with C sab out of Montpellier, France. And we were just, and just at the Pell Center at USGS, and

symbiosis is just starting up in Brazil, that we have connections with as well. So I think the power that the synthesis science, and sees as well is also one that is credibly valuable to community. And I'm trying to remember a couple more, but that that the ability to bring people together in community and learn from each other, and you know, reuse data and have this opportunity for synthesis science is credibly powerful. So that you're, you know, here I have an idea in my own backyard, and it didn't occur to me that we should probably talk to these folks about this initiative as well. So thanks for that. Thank you. Okay, we have how many minutes to wrap up? On MLB MLB. I'm sorry, now Vika go right ahead. Sorry.

M

Malvika Sharan 2:47:43

As always, I'm really enjoying all these conversations. Thank you, everybody, for bringing such diverse ideas. I want to actually also mention and share, you're on the call. So please do help me articulate it better. There is. So this area for curriculum development. And I think someone that the panel also mentioned, where we provide the basic framework that these are things that we want you to learn about, and you can come together with us and build a curriculum that works for your own team. So the carpentries has just launched this lesson development curriculum pilot, that's where I share, please do help me out in there. We have also worked on something called data science and educators program. And the point is that, you know, anybody can teach, they just need pedagogical training. And they also need a little bit of equipments around what it looks like to imagine this particular topic in my own world, a lot of things that you were saying surely, that you have, like lots of folks who have great example in your own organization. So really giving them the tool and sort of empowerment in terms of their own this, this knowledge that we are hoping that you would benefit from and also some of the points that came up, were around, you know, being specific. And I know that you've also mentioned that in the slides yesterday and today, which is the fair principles findable, Accessible, Interoperable and reusable. And with indigenous data, you have care principle, so you know, making it really like actionable but showing it as like guide guiding guidance rather than recommendation something in line with but also against what girls are saying.

S

Shelley Stall 2:49:30

Thank you for bringing up the care principles. I have actually partnered with the folks that have developed this principles. We have a paper in Nature together and also in data science journal co data's data science journal. These folks are amazing. I don't know if the panel has any indigenous background. But it would be fantastic to maybe consider that as a as a discussion point. They are The care principles are more recent than fair. And they're they're very seated in as you know, the sovereignty towards indigenous peoples, their concepts also apply to any vulnerable community, and any community. So the work they've put into this is incredible. They're currently working on how it can apply how we can put things together. One of the observations we made when we were looking at fair and care together, and there's trust as well, there's a trust for repository. So for those of you who are keeping tabs on the number of of acronyms been flying around, we've got there's there's three I know of care, fair and trust. And there's a number of talks out there that you can google and find somebody telling you all the differences. The the care benefits, if FERS implemented well, because you are able to then have the nuanced metadata necessary to protect what the indigenous community is interested in protecting, and all of the different ways they want it protected and identified and made available or not made available different times if you're different, different aspects of the



people asking, so it's much more specific to their culture. And then it's not the same across the communities. I and I am always afraid to talk about these things. I told them this at one point, I am, I'm an ally, I am I am not knowledgeable enough to represent them at all. So I don't want anyone to think that I am speaking for them. Now, I am not. But I am incredibly supportive of their work. So if this would likely be something that we could add in, they'd need some time to figure out what implementation looks like they have not gotten there yet. I work with a team that's trying to build repository guidance, how what, what is the responsibility of a data or software repository when it comes to housing, indigenous data? And if you think about it, you satellite data, you've pretty much had digital data, because guess what? And then how do we identify that? And then what do we do about it? So none of that is understood yet? There's not a at least not understood well enough at scale. So we, it's coming. So So as it's getting, I think that's a fantastic thing to ramp up on to the work that we do. It's Thank you. Yeah, that's great. I'm so glad you brought it up. I think we're hitting a time. That's important. Yeah, I

Y

Yvonne Ivey 2:52:52

was gonna say, All right, we probably have room for one more question. Open if there's residual hands,

S

Shelley Stall 2:53:00

and one just put his hand up.

P

Pen-Yuan Hsing 2:53:05

Oh, am I on? Yes, you are on? Oh, okay. So okay, I'll try to make this quick. I know, we're almost out of time. So this, this is much quicker than my previous comment. So. And this is kind of like a high level question for your designing this. So I noticed that software and data are kind of like two of the five high level modules, right. And I know that one of the later modules, or I forgot the name, you do acknowledge there are other digital outputs, you know, from your scientific processes. So I, I just suggest being very clear, and in the language throughout this entire curriculum, that, you know, doing good open sciences, you know, far more than just dealing with the software and data really well, right. You know, you might have education outputs, you might have social media engagement, all sorts of stuff, right? Including open source hardware. So that is a community that I've been pretty involved in. So I'm happy to speak more on those later, outside of today. But, you know, NASA is famous for its, you know, hardware designs, right, that goes to the moon in other places. So I think hardware is a very important part of open science. Now, this is, I'm not saying you have to put down the same level, you know, in the modules as like software and data. But my point is, you know, there's a lot of other stuff and, and the language of the curriculum should make it clear that, you know, our imaginations shouldn't be limited to data and so forth. So that's just a quick comment that I had.

S

Shelley Stall 2:54:37

So I will I will let you know that I'm absolutely for that. I'm also for physical samples. I'm for video, I'm for images and, and yes, we should probably have something in there. I'm also going to be the one who watches the scope screen. So we we will hold all of this and invite folks to can

to be the one who watches the scope creep. So we we will hold all of this and invite folks to can you know, what does it look like? You know, Let's get the Corps out and then we can build on. Right. So, thank you. That is so excited. Yes, I'm all I'm all for the open hardware and beyond.

Y

Yvonne Ivey 2:55:09

Thank you, Shelley. And I will also note looking at the chat, Jim, yes, we we actually had have had conversations with indigenous data. Huge, huge fans. So with that, I'm going to sort of shift us into a concluding day to thank you so much to all of our panelists, and folks who have doubt. And I think at one point, we had 102 people in here, which is incredible. I will note that we are recording this meeting. And so we will be uploading the recording to our GitHub repo, as well as making sure that all of the slides are there as well. And we'll send that out to the participants. I do want to note, as well, that I just appreciate everyone's patience with the calendar invites, it seems like there were some issues in kind of getting this out. And so I really appreciate everyone's flexibility, but also just sending the WebEx link along. You can already see how we're building community. And so that's really exciting that we're problem solving in real time. So with that, I want to send a huge thank you to our partners at AGU, who come on board to really help move us forward with the curriculum and again, the panelists taking the time out of their day to really make this an amazing discussion. So for tomorrow, we'll be shifting into really diving into talking about NASA's policy shifts and changes that are really going to be the cornerstone stone of the work that Topps is doing as well as jumping into discussing how we're actually going to be working with underrepresented or traditionally excluded communities around tops transformed open science. So with that, thank you so much. And we'll see y'all again tomorrow. Have a good one.

P

Pen-Yuan Hsing 2:57:10

Thank you everyone. Folks, yeah.