--- Pinned information
 Welcome to the minutes files of meetings of the RDA IG FAIR Principles for Research Hardware - FAIR4RH,
 Here a direct link to our charter: https://www.rd-alliance.org/group/fair-principles-research-hardware/case-statement/fair-principles-research-hardware%E2%80%82-fair4rh, you can then navigate to our mailing list archive (see posts). Please join the group to receive updates via email.
 You may also look at our group pesentation at the plenary 2022: <u>https://doi.org/10.6084/m9.figshare.20103149.v1</u>

zoom link for our meetings (last Wednesday of the month, 8h UTC):https://hu-berlin.zoom-x.de/j/4654730503?pwd=VWl2VGZYSmhraVB2amhGeW5jZy91dz09
 calendar: webcal://p41-caldav.icloud.com/published/2/ODgzNTc1MjM4ODM1NzUyM4PmUiBhr4MPt8MIWY_P1PmfG4WHWG2PJ4wukYI7E_JnKmdkwasdRI4QOTTSQCQ9giCwkIIckfzqNfQ1cUpdiGg
 main contacts: nadica.miljkovic@etf.rs, julien.colomb@fu-berlin.de

<u>Subgroups</u>
 1. Defining research hardware:
 - Chair: Alexander Stuck
 - mailing list at: https://sympa.cms.hu-berlin.de/sympa/subscribe/fair4rh-def_moa Deactivated by sympa admin due to lack of traffic
 - working document: https://docs.google.com/document/d/1dJAy5A0hJtISYpC9Z3aNUVi5U15VsAYa8TH0yGKg64I/edit?usp=sharing

  - archived version https://docs.google.com/document/d/14vQR_24OXVOLGcEB1frAYqKbRZ_Gc8Dtk6bG25720ks/edit#
   - outreach document: https://pad.gwdg.de/fsn-w4kiREqmANvJkZpaNg?both# (MarkDown in HedgeDoc hosted at academic IT service provider)

Towards FAIR for Research hardware from: https://etherpad.hu-berlin.de/ep/p/g.b9vQvzly2nMJWI6l$FAIR4RH-subgroups

Discussion of WG focus
 the question of going towards "FAIR for RH source/digital documentation" versus "FAIR for RH physical objects"

Alexander's opinion: "source" could be building instructions or sth. else. This is data or if you will metadata, because it's data about a physical object. "Digital documentation" might be text, images or similar. But since documentation is _about_ something, it could also be called metadata. There are FAIR principles for data. Why would they **not** be relevant for the case of data about a physical object?
 Alexander considers RH an important concept in research in general and in Open Science in particular. The RDA WG FAIR principles for instruments touches upon this concept. Our definition is broader and allows edge cases like organisms to be included. Physical objects are more interesting/demanding to manage in research and we lack policies etc. That's why Alexander votes for a focus on physical objects.

Documentation of PID for physical objects
There is a working group: https://www.pidinst.org/ and they published a white paper
https://docs.pidinst.org/en/latest/white-paper/index.html#white-paper

In May there is a workshop PIDs for academic events.

Interaction with RDA IG "Reproducibility" during RDA plenary May 14th--23rd
Questions to be answered
• Briefly, tell us about your work/organization and how it's related to computational
reproducibility; What are you trying to address and how?
While scientific advancement (and therefore reproducibility) is often dependent on specific
Research Hardware (physical object developed as part of or for a research process, RH),
information about the RH is generally lacking, and efforts to provide it are inadequately
incentivised in the current academic landscape. At the same time, development and
dissemination of hardware (from prototypes towards market-ready designs) could be
facilitated using open source hardware standards and FAIR principles.
By defining research hardware (our first output currently under review, https://www.doi.org/
10.15497/RDA00105) and by adopting the FAIR principles to RH, we aim at raising
awareness on the importance of sharing an exhaustive documentation of RH within
FAIR4RH IG. Concurrently, we hope to contribute to better recognition of RH as a valid
research output. We are not dealing with "computational reproducibility" per se. However,
FAIR principles for RH can contribute to the RH reproducibility, especially in the sense of
proper documentation ("To improve reproducibility, it is imperative that these novel
instruments are properly documented" [Bowman, R. W. (2023). Improving instrument
reproducibility with open source hardware. *Nature Reviews Methods Primers*, *3*(1), 27.].
Moreover, RH can be strongly interdependent with software (in some cases software is
required to run the hardware) so computational reproducibility is essential to achieve
reproducibility of an RH or of a method that utilizes RH.
• What is your/your organization's vision when it comes to computational reproducibility
(e.g., all scholarship is computationally reproducible by default)?
We cannot speak on behalf of all members of RDA FAIR4RH IG, but yes all scholarship
should be computationally reproducible by default. However, we do not feel that RH should
be reproducible by default as RH definition: (1) do not envision RH to be documented at all
and (2) do not consider RH complimented with the FAIR digital assets (hardware design
files, software, documentation, and branding). Disseminated research hardware and
especially scientific hardware should be FAIR and reproducible.
• What are some of the challenges you see to achieving this vision?
Two main challenges we can think of are that: (1) RH can be dependent on hardware
components that are not always easily accessible and (2) that hardware reproducibility can
come with costs.
• What would you like to ask the members of our Interest Group?
Are FAIR principles required for reproducible research? Would you consider expanding
reproducibility outside of computational realm and how do you see RH reproducibility? Does
the RH definition make sense in your reproducibility context? What should we consider for
aligning FAIR principles for RH?

MINUTES
Please feel welcome to add elements to the agenda and discuss things before the meeting
starts in the corresponding section

Next meeting
 - We got feedbeck from the RDA IG "Reproducibility" on July 23, 2024: https://docs.google.com/document/d/12oFKueNo4MTgHePe1wFdqbCSf7hjaTZxTnsRW9fgPjo/edit#heading=h.obettif9857z that could be used for our next outputs

Meeting 2024-01-17
 Present: Julien, Moritz, Santosh, Mirco, Nadica
 - "These (digital or analog) objects are called artifacts, the collection of these artifacts is called hardware documentation package." - it is discussed that in the document we should use one term and add a note that there are other synonyms, both terms should be used for keywords
 - Assets and artifacts are mainly discussed synonyms - it is decided that we would use assets, but the note will be added to emphasize there are other terms as well
 - Mirco raised a question that Table 2 anf Fig. 2 do not correspond to reagents (which is by our definition also example of RH). It is concluded that Mirco will propose changes/additions to Fig. 2 to include reagant, as Nadica explained that Table 2 summarizes literatur
 - Fig. 2: https://github.com/open-make/FAIR4RH-RDA-IG/tree/main/RH-documentationcontent (license part will not be included in the document) - maybe less color for more readibility
 - Nadica proposed that List of definitions and List of terms should be added in Appendix for more readibility (also in compliance with the first comment from Jean-François)- let's do some research how to make the glossary and where. (this may also apply to use cases)
 - Examples of closed hardware are missing (patented hardware described in research paper, hardware described in research paper but not shared) - it is agreed that one or two good examples will be added in the document
 - Next week the document will be closed, but this week it is open for comments (that is the current plan)
 - Nadica will check with Alexander does he agree with output to be finished in January and presented in February 26 at the Organisational Assembly meeting as Brdiget Walker proposed
 - Nadica will also check is Alexander free for the meeting with her next week, just to check whether he agrees to all steps defined today
 - Author byline
 - other points ?

- FAIR principles for RH, or FAIR4RH documentation package ?

- Presenting the output (Google doc review?, RDA review, https://www.rd-alliance.org/rdas-22nd-plenary-call-sessions-open, https://zbmed.github.io/damalos/, and
 Organisational Assembly proposed by Bridget Walker)

Meeting 2023-12-13

- RH definition document updates
 - We need to discuss whether we want to work on the FAIR principles for RH, or RH documentation package (the ensemble), or RH documentation artifacts (each component of the documentation package)
 - Author byline discussion / group as author,...

- Artifact has different meanings, assets may be better.

- general feeling about doc dealing with electronic hardware first.

- • - add some examples of non-electronic hardware
- • - see note about reactants /reagents
- •

Table 2: about references.
 digital assets are provisional, you can but not must have.

Fig. 2: other asset/artifact for reagents

We need to tell why we chose artifact or asset

- •

- •

- • TODO: add use case:
- • - reagent
- • - closed hardware
We voted an went for "asset" instead of artifact. We will write a small paragraph about the decision.

- • https://en.wikipedia.org/wiki/Digital_asset
- • https://www.fu-berlin.de/en/sites/forschungsdatenmanagement/glossar/digitalisat.html
- • https://www.omgwiki.org/MBSE/doku.php?id=mbse:digital_artifact
closed hardware:
 - microscope : we can give a link to a paper?
 - parts of open hardware that are closed ? (edge case): http://www.brownleeprecision.com/products/amplifier-model-440/, https://www.a-msystems.com/p-287-model-2200-analog-stimulus-isolator.aspx, https://www.a-msystems.com/s-5-stimulation-instrumentation.aspx
 - looks at patented example ?
 -

Meeting 2023-11-15 Finalizing RH definition document + RDA meeting, 9 am CET

Zoom link: https://hu-berlin.zoom.us/j/4654730503?
pwd=alJvSVlnNFJkS1BYZWo1NFQ3d0phZz09
 Present:
 Julien
 Alexander
 Nadica
 Mirco (Trieste, researcher in material science - moving to data management.

Assigned tasks:
 - Nadica to add new Figure 1 and to communicate with Bridget about the FAIR4RH output (proposal:
 https://docs.google.com/drawings/d/
1S1o6bFofVGUS5VxNSDcIgZVfQpAOEmZnRvxH9B_8Kr0/edit?usp=sharing)
 - Alexander to think about (propose) new Figure 2 that would present relation with digital assets and physical objects (in next two weeks)
 - Julien will go through the document once more to check whether we have other confronting

parts
 - Mirco to read the document and add comments

figure:

1. rounded - software and open hardware + add hardware in research (+ research output)
 2. relation between physical object and digital objects, open hardware

Meeting 2023-10-17 Definition RH + RDA meeting
 The mismatch between the proposed definition and literature review is discussed. It is agreed
to once more check all with group members, especially with Alexander.
 Present:
 - Nadica
 - Julien

Meeting 2023-09-27
 - Definition RH: https://docs.google.com/document/d/
1dJAy5A0hJtISYpC9Z3aNUVi5U15VsAYa8TH0yGKg64I/edit?usp=sharing

Meeting 2023-08-30 Definition RH + extension + RDA steps
 Present:
 - Alexander
 - Ana
 - Julien
 - Nadica

Assigned Tasks:
 Julien?
 More comments?
 Should we move the figure which means more work on the text or wait for community
feedback?

Next Steps: publish this as RFC at RDA via TAB Liason

Authors/Contributors?

Meeting August 16 2023, 9 am CEST

Present:
 - julien
 - Vladimir Milovanovi´c
 - Freya
 - Alexander
 - Moritz

Agenda:
 - welcome new members
 - RH definition work:

              •   - RH definition ready, needs some suggestions:

- - Figure: different shape for physical and non-physical objects
- - maybe put the figure at the start of the document, as an introduction to the discussion ? would need a good caption refering to discussion in the document.
- August final meeting poll
- https://terminplaner6.dfn.de/en/p/c91068234148c1d8d9c1fdda92e51474-358479
-

- planning the next steps

- - RH document for end of August !
  - - open make conference
  - - RDA: poster session could be an option. Freya and probably Julien will go. https://www.rd-alliance.org/rdas-21st-plenary-call-posters-open deadline poster abstract 1 september

Meeting July 05 2023, 14 am CEST

Agenda:
 - Report on workshop at the OSC2023 (online event)
 Ana P, Julien C and Moritz M reported about their workshop activities, FAIRness and Openness were in Focus,
 Interesting links shared during the meeting:

- HERMES project: https://project.software-metadata.pub/
 - Hardware review: https://en.oho.wiki/wiki/The_OHO_Project_Directory
 - code review: https://software.ac.uk/code-review-clinic (Nadica)
 - https://github.com/opencomputeproject/CADCloud

- subgroup reports
 - discussion RH definition:

All in one document at the moment.
 explanations are at the end of document, maybe this needs to be moved.
 Use cases: recruiting people. (bullet points -> table)

- RH = physical entity ? FAIR relates to RH documentation.
 - RH documentation: firmware, gateware not in def., design needs more explanation?

Gateware: kind of design files for CPUs, can sometimes be simulated with other CPUs. Part of the design file definition?
 https://en.wikipedia.org/wiki/SystemVerilog, https://en.wikipedia.org/wiki/VHDL, https://github.com/stnolting/neorv32

- accessbility to non-expert should be discussed at some point

Meeting June 01 2023, 14 am CEST

Agenda:
 - report open make: book dash and open science conference: https://the-turing-way.netlify.app/index.html, https://www.openmake.de/blog/2023/05/11/2023-05-11-

workshop-at-the-open-science-conference/
 - subgroups reports
 - task
 - a meeting calendar till the end of 2023

Question: publishing the Research hardware definition: RDA output + a journal ?

- • - ask joshua
- • - check with PHD rules at FU
- • - ask Julieta about a putative journal
- •

About examples and best practices: limit to research hardware or not? (probably not)

- •

Meeting March 28 2023, 10 am CET

present:
 julien
 nadica
 steffen brinkmann
 Özlem Özkan
 Santosh Ilampurathi

- News: new member ?, turing way bookdash.
 - Nadica: research hardware definition: work in progress

- • - Intro FAIR4RH group at RDA
- • - Chair of subgroup: Alexander Stuck
- • - google document ,20 pages
- • - minutes on this document (with the whole group meeting minutes)
- • - work:
  - • - scope
  - • - RS definition -> RH
  - • - broaden the scope, not limited by RS definition
  - • - RH and application field ? decision: no limitation
  - • - practitioners input would be important, but difficult to get these people interested
  - • - literature review: mostly based on open hardware.
- literature survey:
 - RH = digital assets (including software), or physical artefacts.
 - scientific hardware : rigour /research hardware: quality is part of definition ?
 - level of complexity:

- hardware - RH - scientific hardware

-> In short, very impressive work. We hope to get to the first publication stage in 2 months (will still go under community review at RDA)

- •

- Julien: FAIR for Research hardware, subgroups creation

- • - presentation of the 4 subgoups idea
- • - discussion about liberating hardware (data produced, but also the hardware itself): there are legal issues, but we should do it anyway.

Meeting Feburuary 2023, 22 13h CET

- Attendees: Julien Colomb, Alexander Struck, Louise Bezuidemhout, Robert Mies, Sara Coppini, Ozlem Ozkan, Nadica Miljković

- Agenda:
 - welcoming new members
 - Research hardware definition group update

- • - scope to be discussed, for example military/commercial/citizen being in ~~oprn~~ hardware project: why/why not include them.
- • - Nadica: worked on document and references. Maybe reviewing the literature should come first.
- hackathon idea:

- • - Jerry should contact Alexander and come with a proposition in march. Jerry and Alexander will discuss a collaborative meeting and likely invite group members.
- next steps, todo list until next meeting:
 subgroups in charter (lead: topic):
 how to go with this?

- next month, make presentations:

- • - Nadica: RH definition
  - • - Julien: Subgroups (without leaders) for FAIR principles work

Meeting January 2023, 25 10h CET

- Attendees: Julien, Nadica, Jerry, Elisee

- • welcome new member (Elisee)
  - • Elisee discussed his interest in open research hardware with Nadica and she proposed that he can asist Alexander with OH use cases and that she'll connect them
- • Discussion on Community Cross-fertilisation RDA workshop and document asked
  - • Nadica will send an e-mail to all group members to invite them to register for the workshop (February 23, 2023)
- • Jerry proposed to organize a workshop/public discussion/event/hackaton/bookdash on FAIR for open-source research hardware (he will get in contact with Alexander and come with a concrete proposal in February). We want to try to avoid restarting the discussion from scracth, confirmation bias and off-topic discussion.
- • Nadica and Jerry said that they will work on the research hardware definition document
- • Julien will send a poll to schedule group meetings
TODO: send email to the group about the workshop (Nadica)

Meeting December 2022, 14th 9h CET

- Attendees: Alexander, Andreas, Julien
 - Alexander schlaegt vor, die de-RSE Mailingliste anzuschreiben, um zu fragen, ob sie Meinung zu RH haben und Literatur mit Beschreibung (offener/selbst entwickelter) RH, z. B. https://www.hardware-x.com/article/S2468-0672(18)30091-9/fulltext

- • 	- Vorschlag befuerwortet und sollte parallel mit anderen Outreach-Efforts angegangen werden.
- Creating a ZENODO community, like FAIR4RS (https://zenodo.org/communities/fair4rs) ? a curation process would allow to aggregate relevant research output at ZENODO if original authors to add the community to there publish work, will be visible in EOSC via OpenAIRE
 - suggestion for, short, fair4rh community <== Alexander likes the description and curation policy!
   - **description**: "The FAIR for Research Hardware (FAIR4RH) was established as an Interest Group (IG) at the Research Data Alliance (RDA) in 2022 and is concerned with equipment/hardware used for scientific research. The FAIR4RH IG works in recognition of the role that equipment and hardware play in the advancement of the research sector. Website at RDA: FAIR Principles for Research Hardware"
 - **curation policy**: "The FAIR4RH IG has a curation committee that will review new uploads before adding works to this community. We accept contributions such as slides, abstracts, documents, whitepapers, etc., that contribute to our goal of community-led discussions on how to define and effectively apply FAIR principles to research hardware and to achieve the adoption of these principles."
 - exists a logo?

Meeting November 2022, 23th 10h CET

- Attendees: Alexander, Jerry Julien, Moritz, Andreas

- • 	- GOSH gathering in (26th to 29th of October 2022) Panama and FAIR4RH promotion by Moritz
    - • Moritz was part of one of the working groups
    - • It was not a normal conference, but an unconference
        - • The allocation of "sessions" happened on the first day collaboratively
        - • Everyone put 3 topics that need to change in the coming years, all in a big pool, then clustered. these clusers became sessions.
    - • Moritz facilitated the "academics and research hardware" session, for example.
    - • Around 40-60 sessions, Sessions overlapped, one missed out on a few
    - • List of topics discussed there: TODO LINK
    - • documentation (pics) has been done but still needs to be organized/gathered
    - • Moritz mentioned our efforts in during GOSH and invited people to join, positive general verbal feedback but no actual joiners so far
    - • GOSH is drafting a constitution, regulate how elections are run, who is eligible, etc ... Moritz may become member of the drafting team and push for process how to interface with other groups
- • 	- welcome new members
    - • New members in the RDA group, but no in todays meeting
- • 	RDA podcast: https://www.podbean.com/media/share/pb-nw3iy-130f647
- • 	- current outreach activities

- Julien to have student to add contact info for new suggestions and Julien will contact them
- - Definition of research hardware subgroup progress
  - Alexander's work was stalled for 3 weeks due to absence, not available for Dec/Jan meeting unless we reschedule
  - 5 members on mailing list, documented contributors to the DefDoc = 2, still not enough to provide a global definition of RH, does it make sense to send invitation to FAIR4RH group again or should we get new members before that?
    - going forward: Keep working on the document and invite more people, Moritz Maxeiner suggested to have someone from DefGroup to create an inviting post at GOSH forum, probably Nadica
  - has Michael O. contacted any of the suggested people or should someone else do that? see outreach pad
  - DefDoc: Nadica reacted to some comments by Joshua Pearce in our definitions document and cleaned it up, Alexander added a scope and resolved some comments
  - Alexander suggests to add descriptions of research hardware from 'scientific' literature in order to document spectrum
- - next steps.
  - have a first definition to "bash".
  - work more intensively on getting new members of the subgroup.

Meeting November 2022, 13th 10h CET - this meeting was never held (this was in plan for November 23 - sorry if I made this typo) - Nadica

- Open Call RDA/EOSC https://eoscfuture-grants.eu/provider/research-data-alliance/rda-eosc-future-call-interoperability-framework-contributions
 - Participation in 10 years of RDA (https://www.rd-alliance.org/plenaries-events/events/%E2%80%98-decade-data%E2%80%99-celebrating-10-years-research-data-alliance) to attract more people to join the subgroup (Nadica)

- - the month of February 2023 will be devoted to the "FAIR data, software and hardware"
- Suggestions for visibility improvements (CURE-FAIR experience https://www.rd-alliance.org/groups/cure-fair-wg, Nadica)

- - To add a link to Google questionnaire (to create Google questionnaire) for all interested to fill their e-mail to join the subgroup?
- - To add link of the group statement on the main page of the IG

Meeting october 2022, 26st 10h CET

- Attendees: Alexander, Jerry, Nadica
 - News since the last meeting from the outreach activities (many people did not respond) - it is discussed that we should continue to reach out, but we should focus on other things as well
 - Future actions are discussed and agreed for the Subgroup on Research Hardware definition

- outreach plan
  - Alexander will continue with e-mail, Jerry suggested to reach out to his contacts, Nadica will present FAIR4RH on Open Science Days in Serbia and spread to her contacts

- e-mail campaign is available at https://cryptpad.fr/sheet/#/2/sheet/edit/U0RKJTLoP6-vV8T9cDFG1q13/ (internal document)
- outreach document is available at https://pad.gwdg.de/fsn-w4kiREqmANvJkZpaNg?both# (IMPORTANT: in case you contact someone by e-mail campaign add info to the Cryptpad)
- drafting the overview of gathered examples and literature review
  - Nadica will add more structure to the document to make it more appealing for others to contribute (current doc: https://docs.google.com/document/d/14vQR_24OXVOLGcEB1frAYqKbRZ_Gc8Dtk6bG25720ks/edit#)
    - references will be added to the document and the list can be expanded (their name, contact, affiliation/background)
    - list of contributors in the end will be added
  - Alexander will check the new document before sending an e-mail reminder for group members to join subgroup and link to the document
    - The Google Doc should be shared via "suggest" mode.
    - Alexander will also ask about other comms platforms for the subgroup as Jerry suggested
  - Jerry is willing to provide reviews of some publications w.r.t. to hardware policies.

- Other

- the RDA-US podcast presenting our IG will be available during the first week of November

Meeting september 2022, 28st 10h CET

- News from RDA podcast.
 - News from outreach activity planning:
 - Andreas reached out to people he knows
 - Julien, Nadica and alexander will send the new round of email (hardwareX)
 - for Moritz at GOSH panama: maybe propose a session on defining "research hardware".
 - contact people responsible for. open science hardware definition at GOSH.
 - prepare next meeting with Nadica. : defining what to do (get clearer instruction) so that people can engage more.

Meeting August 2022, 31st 10h CET

Goal of the meeting: create a list of aspects to address FAIR4RH application (subgroups)
 Agenda:
 - podcast series invitation https://www.rd-alliance.org/podcast
 - report from the definition of RH group

- three people successfully subscribed to the mailing list
- such definition work should be handled by a larger and more diverse group
- if we don't reach larger group, we will continue with smaller number of members and then try to attract more people during the review process
- FAIR people would be contacted later when we have some output from the subgroup
- reaching out to Authors of papers on open/research hardware to assist us with the research hardware definition or to people with specific quesitons

- Strategy to apply FAIR4RH/differn use cases:

- • - Look at the FAIR4Rdata, FAIR4RS and see what is not applicable
- • - look at each element independently (f,a,i,r)
  - • - look at OSH principles / DINspec and see what is applicable to non-open hardware
  - • - look at documentation for patent: what is relevant
  - •

  - • - expand the definition of accessible ?
  - •

  - •

  - • - seen from the authors: prototype / replicable hardware is a goal
  - • - seen from the (re-)users (different kind of re-users)
  - •

  - • - workflows examples

TODO:
 see email as basis for text (Thu., 18.08.2022 10:18) to join def. subgroup and also add optional paragraph / background on the Fair4RH IG to attract new members (all)
 reach to Julietta to attract contributors to curriculum of OH Makers - based on GOSH forum post (Robert)
 gosh forum post (Moritz)
 hardware X and OJH editorial board and authors. @Alexander will contact hardwareX editorial team (https://www.sciencedirect.com/journal/hardwarex).
 Andreas will reach out to contact of people of Latin-America, Australia, so that more people can join
 get more information on podcast (Julien and Nadica) and prepare it (include call for more persons to join subgroup)
 Reaching out to contacts from FAIR4RS (everyone involved in FAIR4RH)
 Alexander will create an e-mail draft for reaching out and ask comments from other members

meeting July 2022, 27th 10h CET,
 Alexander cannot join today due to meeting conflicts but is interested in joining the RH definition team
 - RH definition team -- Moritz Maxeiner, Andreas Czerniak, invite Alex and ask to lead
 - Defining different approaches for the application of FAIR for hardware.

A public reachout and share session to communicate what we would like to do and invite people to participate in the sub-groups/tasks.
 - dissemnation of this possible throught the RDA mailing list
 - the Open Science Communities (that are present in NL) https://www.osc-nl.com/
 - GOSH and OSHWA (oshwa.org) groups
 - BSI? https://www.bsi.bund.de/EN/Home/home_node.html
 - DIN? https://www.din.de/en/about-standards/din-standards (Ask Jerry de Vos) Alexander used to work for DIN Software GmbH (the digital/online branch of DIN standards)
 - open next and partners (oho, ose)
 - CERN
 - ESF: https://www.esf.org/

- HFSP: https://www.hfsp.org/

Reachout event - Tentative set for early October -- Specific dates to be decided.

Present people:

- • Moritz Maxeiner
- • Santosh Iliamparuth
- • Julien Colomb
- • Andreas Czerniak

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meeting June 2022, 29th 10h CET, https://hu-berlin.zoom.us/j/4654730503?
pwd=alJvSVlnNFJkS1BYZWo1NFQ3d0phZz09

- RDA plenary and stakeholders discussion:
 - notes and links at https://docs.google.com/document/d/1FAMHQXa3sB4BNj9F8h7Pd-
lmR-FmhauRNYAsnXKH2bQ/edit?usp=drive_web&ouid=114659130255583378070
 - second session cancelled
 - low attendance, but fruitful discussions.
 - 3 new members
 - datacite contact
 - Charter reviewed !!
 - outreach (video: https://doi.org/10.6084/m9.figshare.20103149.v1)
 - RH definition

interesting points:
 How can FAIR research hardware create FAIR research data?
 RH documentation: for what, for whom, by whom?
 hardware calibration issues
 very diverse stakeholders

- • Personas used in other group:
  - • - ask for role in surveys
  - • - basic personas, not very detailed (user/developers)
  - • - used for RS definition, not for FAIR
  - •

  - • PID 4 instrument noes:https://docs.google.com/document/d/
    1In8n4xNisrt1JtOpXMB12TzyZzrmiZMC1Q6GbXlE9v0/edit?usp=sharing
  - •

  - •

TODOs:
 Gosh forum entry/blog post with results from plenary + video presentation
 set group for RH definition (to be published as RDA output? group coordinator as first
author?) -> email to find coordinator and reporter.

send a reminder for the next meeting + welcome new members (infos)!

to do: ~~charter~~, ~~presentation change~~, new slide with topics to choose, ~~check with secretariat about orga.~~, ~~email with datacite~~

Plenary sessions agenda ideas

- • - add one slide about topics to discuss, let people choose
- • - ASK SECRETARIAT about organisation of session (breakout-
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- presentation + question (30 min)

- • - Louise: add case study -> presentation + question will last 45 min.
- • - use a case study, to point main issues (discussion: are there other we missed)
- Join the group time (2min)
 - understand the target group: who is here?, map personas

- fill a spreadsheet or hardware examples (20 min)
 - answer question for each hardware example: is it research hardware , why/why not (10-15 min), discuss the answers (20 min)

- discussing the subtopics for the subgroups (for FAIR4RH application work)

- discuss strategy to engage LMIC (10-45 min) : dangerous, probably to be avoided

- metadata discussion, datacite -> similar discussion in the PID for instrument plenary

- breakout: where the FAIR data/software principles need to be expanded (25 min)
 - Nadica: update attendees about current activities
 - engage attendees in current activities (as previously stated why something is or is not research hardware and use this output for our document)
 - I can try to record in advance this presentation, https://youtu.be/MW5FLy1l9LI with slight changes (what is the deadline?)

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 Notes:
 If you're looking to add more content to this, I'd make use of a case study to really dig into the problems associated with OH. You might use Richar and Julian's OpenFlexure as an example of both the opportunities and challenges. I think it would be really good to a) make

sure that the audience has a clear understanding of how OH differs from data/software as well as commercial equipment. You could add a breakout room discussion that looks at where the FAIR data/software principles need to be expanded. I'd also keep the discussion on LMIC membership to a minimum. If this session is to introduce the IG to RDA it is important that it looks as an IG with a clear focus, and not simply a recruitment activity. I know, of course, that this is not the case. However, some audience members in RDA plenaries - in my experience - get the wrong end of the stick.

 Presentation v-02 feedback:

- OUR SESSION IS 1H30 LONG, we need to get the presentation a bit longer probably! Any ideas about organising a discussion, taks to take,... ??
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- - add one slide about Nadica's paper.
- - one slide about people
- - add one slide about topics to discuss, let people choose
- - add slide about sources / references,..

- (Nadica): examples of research hardware are still missing (from below: https://github.com/SanliFaez/FAIR-Battery - FAIR battery by Sanli Faez - talk given at Delft open hardware - https://delftopenhardware.nl/05updates/93openbattery.html)

- -Julien: no image or good description of the FAIR-battery project + not sure we have the time.
- - (Nadica): There's a collage at 52:41 at https://youtu.be/ZFNe65W2eck. Some keywords are energy storage, sustainable electrification, renewable resources, FAIR, and enhanced accessibility by locally available materials (in LMIC as well). Sources are youtube and git link above as well as https://www.uu.nl/en/news/uya-member-dr-sanli-faez-receives-open-science-grant Hope it helps for short slide?

- (Nadica): we agreed to add LMIC instead of Global South or to at least point out that everyone are welcome, please change this to be in line with our agreements below
 - you mean in the slide or in the talking ? let's discuss how to achieve that, it may require some modif in the order of slides ?
 - (Nadica): I meant in slides. I agree that this can be solved by comments, but please keep in mind that we changed this in the Charter according to Reviewer's comments. Currently, presentation differs from the Charter that is my exact concern.
 - (Nadica): slide 10 - should be Organization instead of Orga in the title -that one is easy :) - (Nadica): Perfect.

meeting May 2022, 25th 10h CET, https://hu-berlin.zoom.us/j/4654730503?pwd=alJvSVlnNFJkS1BYZWo1NFQ3d0phZz09
 Meeting ID: 465 473 0503
 Password: sfb1315

One tap mobile
 +496971049922,,4654730503# Germany
 +496938079883,,4654730503# Germany

Meeting ID: 465 473 0503

Password: 8123923
Find your local number: https://hu-berlin.zoom.us/u/cebmX1Haov

Agenda:
 - should we move meeting at 9 CEST ? No
 - plenary presentation: https://github.com/open-make/FAIR4RH-RDA-IG/blob/main/
presentation

- • - good summary
- • - FAIR4RS as partner group
- • - anyone can join, especially global south but not only
- • - couple of examples (explain the examples) - open batteries
- • - LMIC is a priority for the whole RDA
- • - DFG not including hardware, is it really that reasons. Relation to IPR also ?
- • - Hardware is more than the sum of its part. (data,doc,software, as they do interact and need common version control +licenses)
- • - https://github.com/SanliFaez/FAIR-Battery - FAIR battery by Sanli Faez - talk given at Delft open hardware - https://delftopenhardware.nl/05updates/93openbattery.html
- • - who register (early bird 31.5) ?
- • http://labs.tudelft.nl/ - FAIR steps on instrumentation
- we applied for the non-Plenary online Bootcamp, but the overall proposal didn't pass
 - charter v.02: https://docs.google.com/document/d/1or0EyVCv_Nah5yy2mmYcdlPqRVZvZx-4WItfsSB-OZw/edit?usp=sharing

- • - ask to know how to answer review
- • - answer both directly and integrating text in the charter.
- • - see charter for other points.
- • - Steps in the FAIR aspect - http://labs.tudelft.nl/
- RH definition: https://docs.google.com/document/d/14vQR_24OXVOLGcEB1frAYqKbRZ_Gc8Dtk6bG25720ks/edit

- • - make a subgroup? define a leader?
Hi all, sorry that I am not in the meeting, I thought it was at 9 in the morning and had already planned a meeting at 10. Here are my ideas on the feedback: for reaching the global south, We have a Delft Global Initiative for international projectst, I know they did projects in Nigeria, Kenya and South Africa, these are all quite simple to reach and dont have much of a language barrier. We can ask for contact details (Nadica: Thanks Jerry. That would be great!)

meeting April 2022, 27th 10h CET

Agenda:

- news from RDA plenary:

- • - advice: in the end at least. give practical tasks/outcomes

- -
- 4S panel discussion
- GOSH Gathering, https://gathering2022.openhardware.science/apply/
- Research Hardware definition: https://docs.google.com/document/d/
14vQR_24OXVOLGcEB1frAYqKbRZ_Gc8Dtk6bG25720ks/edit?usp=sharing

- leave it as a spectrum, look for feedback and edge cases.
- how to relate to the open software part of the research hardware: leave it out, take it in?
- RH: it exists when it is used/shared/described ?
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Alex: relation to RS (good), excluding research hardware developed in industrial content
- scoping report https://docs.google.com/document/d/
1deNlVG1coqhbmSvPMdgqD5LXbOE2uhcTfNybV9O9qUM/edit#heading=h.gjdgxs
- next steps
- call members from RDA RDMInEng IG to comment Case statement

meeting March 2022, 30th9h CET,

Agenda:
- Get the charter ready for endoresment https://docs.google.com/document/d/
14vQR_24OXVOLGcEB1frAYqKbRZ_Gc8Dtk6bG25720ks/edit?usp=sharing
- Discuss plenary session
- Set short term/longer term objectives (subgroups?)

Issues to tackle:
research hardware definition:

- - research hardware in non-academic context: is it research hardware
    - - santosh like the definition already
    - - collect examples/use case/boundary cases to help with the definition
    - - make an open document.
FAIR is not open: what do we mean by that.

meeting Februare 2022, 23th9h,

Agenda:

- Decide on a recurrent time for our meeting (RDAs usually have CET afternoon meetings)
    - last wednesday of the month (30 March, 27 April, 25 April, 29 June) at 09:00 till 10:30 CET
- New chairs? -> rediscuss next time.
    - Find new and more diverse people
- Discuss the charter :https://docs.google.com/document/d/
14vQR_24OXVOLGcEB1frAYqKbRZ_Gc8Dtk6bG25720ks/edit?usp=sharing

- RDA plenary session proposal
- Next steps
  - calendar
  - grow the group
  - work on charter: research hardware definition
  - If we are happy, send the charter
  -

Present people:

- Moritz Maxeiner
- Nadica Miljković
- Jerry de Vos
- Alexander Struck
- Julien Colimb
- Robert Mies
- Louise Bezuidenhout
- Andreas Czerniak

Charter main questions:
- title
- deal wit "open" hardware (how to include -or not- this aspect of FAIR hardware.
- research hardware definition
- discuss outcomes

open and fair: FAIR is larger than open (for data)
Louise: part of hardware is covered by FAIRdata and software, maybe using use case to see what the gaps would help define what the point here is.
robert: ex: share native or editable files make it more FAIR or more open.
https://docs.google.com/document/d/14vQR_24OXVOLGcEB1frAYqKbRZ_Gc8Dtk6bG25720ks/edit#
open source hardware: here open is defined differently than open data, it means open to use and recreate
FAIR for open hardware OR FAIR for research hardware

- - Alexander: FAIR as a way to expand open,
- - louise: separate documentation and the physical elements.sharing physical element should be too high for FAIR? Any research hardware: FAIR = methodology description. Sharing of standards between communities (data, software, hardware)
- - Robert: another practical example. share your things in a format people can not change the design (interoperability issues). Standardisation needed.
- - Moritz: fair for software is made for open source software only, but do not need open.
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- - Nadica: maybe we need to create subgroups. use case to define challenges, see how things are shared, what are the challenges. Charter: list questions, not give answers. For example "what is closed source hardware".
- - Robert: there is no conflict, only different use cases.
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- outcomes 1:
- - reseach hardware definition

- - use cases, current practices : scoping papers
- - Definition of FAIR. (main doc) - links with FAIR data/software that are part of hardware.
- - Beyond FAIR
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- - define subtopics: making subgroups might not be necessary at this point (the group is not big enough yet).
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link from louise: https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1007854
meeting January 2022

19.01.2022,

Present people:
 - Julien Colomb, www.openmake.de berlin, former neurobiologist, data manager, open science advocate
 - Alexander Struck, RSE/CIO at Cluster of Excellence 'Matters of Activity', active member of FAIR4RS
 - Andreas Czerniak (Bielefeld University)
 - Louise Bezuidenhout (DANS)
 - Jerry de Vos (TU Delft)
 - Santosh Ilamparuthi (TU Delft)
 - Nadica Miljković (University of Belgrade)

Agenda:
 - welcome address (julien colomb)
 - getting to know each other
 - discuss next tasks

- - charter
- - other
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For communication matrix, githubforum, and mattermost were discussed.

It was decided that for now, we will be using mailing list and that the calender will be decided (Julien) for monthly calls via Zoom.

In order to gather more members for this group and relevant feedback, we should consider to:

- submit a session to the plenary 22nd february - very important to get feedback and new partners and
 - to spread the idea to our contacts (Louise will post to FricaOSH WhatsUp group)

The RDA charter (https://docs.google.com/document/d/14vQR_24OXVOLGcEB1frAYqKbRZ_Gc8Dtk6bG25720ks/edit?usp=sharing) will be colaboratively written and some useful insights are:

- We can address https://www.repair.org/stand-up in RDA Charter, especially from the environmentally responsible perspective
 - We should check or try to attend https://www.fairsfair.eu/events/fairsfair-event/fairsfair-final-event-2022, overview of work done in FAIR in EU
 - Also, it could be interesting to attend https://www.eventbrite.co.uk/e/tickets-seminar-opening-up-a-flow-battery-by-sanli-faez-228310020417, but we will get feedback from Santosh and Jerry
 - Robert proposed to think about the definition on Research Hardware Engineer and to include it in charter
 - parralel made with Data Management Plan: importance for EU, national, institutions
 - Alexander asked for the charter of FAIR4RS ... and it turned out to be the 'CaseStatement' document publicly available, e. g. here: https://www.rd-alliance.org/group/fair-4-research-software-fair4rs-wg/case-statement/fair-research-software-wg-case-statement