Research Software Alliance
Engagement Plan July – Dec 2021

Acronyms

CSCCE   Center for Scientific Collaboration and Community Engagement

EOSC   European Open Science Cloud

FAIR   Findable, Accessible, Interoperable and Reusable

FAIR4RS   FAIR for Research Software

FAIRsFAIR   Fostering Fair Data Practices in Europe

FORCE11   Future Of Research Communications and E-Scholarship

RDA   Research Data Alliance

ReSA   Research Software Alliance

RSE   Research Software Engineer

WG   Working Group

1. Introduction

The Research Software Alliance (ReSA)'s mission is to bring research software communities together to collaborate on the advancement of research software. Engaging with a diverse range of stakeholders who influence or engage with research software development and use is crucial to this mission.

This engagement plan outlines ReSA's emerging strategy to enable more sustained community engagement, including specific engagement efforts occurring during 2021. This includes envisaging a new tier of organizational members and accompanying activities to connect them on an ongoing basis. By engaging decision makers from representative organizations in an active community, ReSA will amplify the impact of these initiatives to deliver its vision *that software is valued as a fundamental and vital component of research worldwide.*

Since launching in 2018, ReSA has created communities of individuals around specific grant-funded activities to support the creation of deliverables in a community-engaged manner. These fall under ReSA's three core focus areas: policy, infrastructure and people and this engagement plan also details current activities supported by the Wellcome Trust.

2. The ReSA community

ReSA is an online, distributed, global community composed of *key influencers and decision makers* who share ReSA's vision and wish to collaborate to achieve it. Community members together identify challenges, and create and implement solutions across the ReSA focus areas: *people, policy and infrastructure,* as shown in Figure 1.

People
- Aim: improved individual's behaviour and skills; social infrastructure of communities
- Who: Researchers, Research Software Engineers, trainers, community leaders, decision-makers, policy makers

Policy
- Aim: policy advances to improve funding, careers and reward structures
- Where: international, national, disciplinary, organisational levels, etc
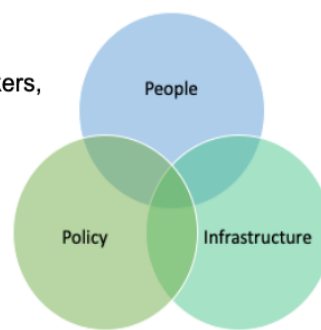
Infrastructure
- Aim: identify and support needed infrastructure
- What:
  - Physical: software repositories and registries
  - Frameworks: standards, guidelines
  - Structural: tools that enable rewards and recognition

Figure 1: ReSA's three focus areas

Over the past two years, ReSA has created a community of 165 individual members, and in 2021 looks to focus on a new tier of members who represent organizations. ReSA's envisaged member structure will have two tiers: organizational members and individual members. By working with organizational members, ReSA intends to scale and amplify its efforts while also creating a potential funding mechanism to support ReSA's ongoing convening role. Demonstrating clear value to those members through successful stakeholder engagement via community consultations, task forces and ongoing communications is key to building a tier of organizational members.

2.1 Organizational members

This member segment consists of people who represent organizations and programs that address the varied challenges in increasing recognition of the importance of research software. They potentially include the 56 organizations identified in the ReSA community landscape (2020), and a wider group of initiatives supporting open science and/or open source software. The key influencers within these organizations who champion involvement within ReSA are usually senior staff, although the impetus can come from anywhere in the organization.

Potential organizational members can be nominally classified into subgroups as described in Table 1, noting that many organizations have multiple foci.

Table 1: Potential ReSA organizational members and classification

National/regional organizations wishing to share best practice and identify opportunities for collaborations
Examples: Australian Research Data Commons (ARDC), Netherlands eScience Center (NLeSC), New Digital Research Infrastructure Organization (NDRIO), European Commission, UK Research and Innovation (UKRI), French National Centre for Scientific Research (CNRS)
Funders who wish to collaboratively develop strategic ways to support open science and culture
Examples: 1) Government: ARDC, Horizon Europe, NDRIO, NLeSC, UKRI. 2) Philanthropy: Alfred P. Sloan Foundation, Chan Zuckerberg Initiative (CZI), NumFocus, Wellcome Trust, Research on Research Institute (RoRI).
Policy-makers who are motivated to share and improve their software-related initiatives.
Examples: 1) National: ARDC, European Commission, NLeSC, NDRIO, UKRI. 2) International: OECD, UNESCO, DORA.
Infrastructures who are interested in advocating for reuse of their services and best practices and collaboration opportunities.
Examples: 1) National / regional: European Open Science Cloud (EOSC), UKRI, New Zealand eScience Infrastructure (NeSI), UK Science and Technology Facilities Council (STFC), Leibniz Supercomputing Centre. 2) Disciplinary: ELIXIR, Molecular Sciences Software Institute (MOISSI), Earth Science Information Partners (ESIP), International Neuroinformatics Coordinating Facility (INCF). 3) Thematic: Mozilla Science Foundation, GitHub, Software Heritage.

Thematic organizations seeking to engage with others to achieve joint goals. These may have a focus on a theme such as training, careers, preservation, sustainability, specific programming language communities, etc.
Examples: Society of RSE and other national RSE associations, Council of International RSE Associations, Research Data Alliance (RDA) Software Source Code Interest Group (SSCIG), The Carpentries, Software Sustainability Institute (SSI), US Research Software Sustainability Institute (URSSI), Science Gateways Community Institute (SGCI), Software Preservation Network (SPN), Better Scientific Software (BSSw), Digital Curation Centre (DCC), Code for Science & Society (CS&S), rOpenSci, Digital Preservation Coalition (DPC), Mozilla Science Foundation.
Publishers seeking to share and evolve their software-related initiatives in publishing.
Examples: Journal of Open Source Software (JOSS), Journal of Research Software (JORS), eLife, F1000, PLOS

2.1.1 Motivations for participating in ReSA community

As described in Table 1, the motivations for organizational membership of ReSA are to access best practice, sector news, networks, opportunities for collaboration, share their initiatives, and influence ReSA's development.

While a detailed organizational member program is beyond the scope of this engagement plan, the key steps required to engage these members are envisaged to be:

1. Create organizational member structure, including ReSA by-laws, eligibility and application processes, and details of what members receive.

2. Agree timelines for launch of organizational membership, and set goals for the numbers of organizational members to be recruited in 2021.

3. Align timelines for the launch of organizational membership with ReSA engagement activities, to ensure that they receive the benefits of participation.

4. Identify anchor members who may be interested to join, and pilot member structure with them.

2.2 Individual members

This member segment comprises individuals who are interested in ReSA's work as it aligns with their own projects. Individual members may be part of an organization that is also a member, but equally may not. They seek to engage with other community members to achieve joint goals, receive feedback and collaborate with representatives from other organizations.

Individual members have different professional roles such as researchers, research software engineers, infrastructure support, librarians, technical leads, and project/program managers.

2.2.1 Motivations for participating in ReSA community

Individual members share common motivations for participation that include seeking to access best practice, sector news, networks, and find opportunities for collaboration and promotion of their initiatives. The diversity of their professional roles also assists in identifying particular focus areas for different types of individual members. For example, research software engineers may wish to access best practice being developed through a ReSA task force to inform their own software projects; librarians may want to access information on international policy initiatives emphasizing the need for research software skills on the resources section of the ReSA webpage to be able to advocate for inclusion of this in their own organization; or project managers may wish to network with colleagues who have experience in creating an inclusive culture in the community that supports their software initiatives through ReSA events.

3. Stakeholder engagement approach

This section describes the stakeholder engagement approach in ongoing and proposed future ReSA programming. ReSA's unique role in the research software landscape is to convene and empower diverse organizational members to work together to consider issues of importance to the global research software community. To achieve this, it is crucial that organizational and individual members have mechanisms to engage that i) match their current capacity and interest and; ii) support them in collaborating to achieve their shared goals. Without satisfying both of these elements through its programming and activities, community engagement within a community usually wanes. ReSA creates these opportunities through community consultations, task forces, and by supporting the dissemination of information and ongoing connection between community members via the website, newsletter, and other communication channels.

3.1 Matching programming to member capacity

For ReSA's work to be successful, engagement with a range of organizations and individuals across diverse geographic and disciplinary backgrounds is required. Different members may have different capacities to participate and so an effective engagement strategy creates opportunities to engage in a mode that is appropriate for each member - with the opportunity to move back and forth across the engagement modes over time.

ReSA's engagement approach is based on the [Community Participation Model](#) from the Center for Scientific Collaboration and Community Engagement (CSCCE), which identifies four modes of stakeholder engagement that can occur within a community (convey/consume and co-create). The model enables the identification of the types of activities that may be relevant to each mode. This model is applied in Table 2 to the ReSA community activities to illustrate the opportunities that ReSA will provide for organizational and individual members to engage in any of the four modes:

Table 2: Modes for engagement with ReSA

Convey/consume	Contribute	Collaborate	Co-create
Information can be accessed via: ● Newsletter ● Twitter account ● Website ● ReSA Zenodo community ● Webinars	Input can be provided through: ● Task force participation ● Workshops ● Newsletter contributions	Participation can be achieved through: ● Organizational members meetings ● Community consultations ● Task force participation ● Events and workshops	Joint leadership is available via: ● Steering Committee membership ● Task force leadership ● Organizational members meetings

For example, some members might choose to engage in a task force where they are able to *collaborate* with other community members via activities that are scaffolded by ReSA. This could position them to lead a subsequent task force where they *co-create* together with other members more independently of ReSA staff. Another member may simply wish to benefit from the outputs of that task force which they access via the newsletter in *convey/consume* mode. This may inspire them to attend a workshop and *contribute* by giving a short presentation.

All engagement activities are supported by the [ReSA Code of Conduct](#) (and in some cases, the [RDA Code of Conduct](#)) and comply with European General Data Protection Regulation (GDPR) requirements.

3.2 Matching programming to member goals

The second key element of member engagement is activities that enable members to achieve their goals by working with others in the community. Table 3 outlines how each type of engagement activity listed above in Section 3.1 addresses the different stakeholder interests previously described in Section 2.

Table 3: Alignment of ReSA activities with stakeholder goals

Activity	Stakeholder goals					
	Access to best practice	**Sector news**	**Networks**	**Collaboration opportunities**	**Share own initiatives**	**Influence strategic direction**
ReSA steering committee membership						✓
ReSA organizational members meetings	✓	✓	✓	✓	✓	✓
ReSA community consultations	✓	✓	✓	✓	✓	✓
ReSA task forces	✓		✓	✓	✓	
ReSA events and workshops	✓	✓	✓	✓		
ReSA participation in external events and workshops	✓		✓			
ReSA google group	✓	✓	✓		✓	
ReSA resources e.g. webpages, blogs	✓	✓			✓	
ReSA newsletter (monthly)	✓	✓			✓	
ReSA twitter	✓	✓			✓	

4. Engagement activities

ReSA's engagement include overarching activities to promote ReSA as a whole, and three specific activities that are being supported by the Wellcome Trust:

1. **People Roadmap** - A ReSA community consultation to identify next steps to identify and prioritize challenges in personnel-related issues, including the provision of career paths, recognition, skills, training, diversity initiatives and policies to support research software community members.

2. **FAIR4RS** - An ongoing task force developing community-endorsed FAIR for research software principles and working through community feedback.

3. **FAIR4RS Roadmap** - An ongoing task force mapping existing FAIR for research software projects into a longer-term framework to improve strategy.

4.1 Overarching engagement

ReSA aims to undertake a range of activity types to reflect ReSA's vision and mission:

- Convene community consultations as the core of ReSA activities to enable the community to collaborate on identification of how to advance visibility of research software.

- Facilitate development of task forces to address community identified priorities.

- Represent the community and their priorities in international and strategic forums.

- Enable better community communications and networks so that research software organizations and communities can access best practices, sector news, networks, opportunities for collaboration, and share their initiatives.

- Identify and promote people, policy and infrastructure resources, such as best practice guides, international recommendations or examples or national strategies.

- Promote and collaborate on development of (where appropriate) events with other organizations (i.e conferences, workshops, webinars) to promote and support influence culture change towards research software as a first class citizen.

- Reach out to related communities to create relationships that help develop synergies with the research software community.

4.2 Research Software People Roadmap

4.2.1 Overview

The People Roadmap is a ReSA community consultation to facilitate identification and prioritization of the major issues related to people (or personnel) challenges faced by the research software community, including RSEs. These may include the provision of career paths, recognition, skills training, diversity initiatives, community development, policies to support this focus, and infrastructure to enable this. Research software community initiatives that focus on these issues are often grassroots organizations and not necessarily well connected to broader initiatives on policy change or development of the infrastructure that will support explicit recognition of varied research outputs.

ReSA will convene a community consultation to identify the next steps to address priority issues. The community consultation will comprise a series of online discussions to facilitate connection of research software initiatives with broader strategic work, with the intention of developing a collaborative approach. This will assist in achieving the vision that researchers are provided with the skills and resources they need to fully utilize research software, through development of a system where policy makers and funders value and promote research software, and where research organizations adequately reward the people whose research contribution is to develop software.

4.2.2 Community members

ReSA is currently identifying key stakeholders for this community consultation, with the aim of including the following types of organizations:
1. Roles/careers/recognition (eg RSE, research software product managers, community managers): Society of RSE, Council of International RSE Associations, URSSI, de-RSE

2. Skills needed and provision of training: The Carpentries, SSI, INTERSECT, NLeSC, US-RSE

3. Community/team development, including diversity, equity and inclusion: CHAOSS, CSCCE, BSSw Collegeville, CS&S

4. Policy: OECD, UNESCO, DORA, government/publisher/funders (to incentivize), employers

5. Infrastructure:

    ○ Physical infrastructure: Knowledge Exchange Openness Profile, CiteAs

    ○ Standards: FORCE11 Software Citation WG, CodeMeta

4.2.3 Activities and modes of engagement

Activities:

1. Clarify the scope of the consultation and identify relevant stakeholders and written resources.

2. Conduct one-to-one interview with stakeholders to identify:
   a. Organizational mission and vision
   b. Strategic goals relevant to the five people-themes above
   c. Main projects relevant to the five people-themes
   d. Collaborators on these projects
   e. Other initiatives involved with (but aren't considered collaborators)
   f. Resourcing
   g. What information (data, policies) is used to support investment in this area?
   h. Future goals/projects in this area

3. Analyse interview data and published resources to explore the following:
   a. What is the range of strategic goals and main projects, and where are there common and/or unique themes?
   b. What are the priority areas?
   c. How much collaboration and/or niche focus is occurring on strategic goals?
   d. When the strategic goals are compared to international work on digital capability in the research sector, are there any potential priorities that are not yet being covered?
   e. Where does resourcing come from for this work?
   f. Consider if information collected enables answers to more specific questions, e.g., how are the needs of personas with different career paths being addressed?

4. Present the outcomes to the research software community in public webinars to validate the analysis, including priority areas, and to encourage the community to consider how to collaborate to increase focus on these areas.

5. Evaluate the project in terms of its scope and stakeholders, to understand limitations and how to better address these in future.

4.2.4 Timeline and milestones

Milestone: Document reporting on the People Roadmap cafes convened in 2021.	Due date: September 2021

4.3 FAIR4RS Working Group

4.3.1 Overview

The [FAIR for Research Software](#) (FAIR4RS) Working Group (WG), jointly convened by the [Research Software Alliance](#) (ReSA), [FORCE11](#) (Future Of Research Communications and E-Scholarship) and the [Research Data Alliance](#) (RDA), aims to create community-endorsed FAIR principles for research software by mid-2021. This is a critical first step for advancing recognition of research software. The resulting adoption and implementation of FAIR principles for research software will create significant outcomes for many stakeholders. These include: increased research reproducibility for research organizations, clarity for funders around their own requirements for software investments, and guidelines for publishers about sharing requirements.

4.3.2 Community members

The FAIR4RS WG is a global, interdisciplinary community composed of over [220 members](#) who collaborate online, plus over 90 individuals have attended and/or contributed to FAIR4RS discussions. There are a range of stakeholders that need to be involved, including those from different disciplines and geographic backgrounds.

1. **Users** of research software

2. **Developers and/or maintainers** of research software

3. **Creators/implementers of policy** around research software and/or other research outputs for a team, department, organization, nation, region (e.g., managers of RSE teams, libraries, faculties)

4. **Managers of infrastructure** that supports usage and/or development of research software and/or other research outputs (e.g., publishers, archives, repositories, registries, indices)

5. **Funders** of research software and/or other research outputs

4.3.3 Activities and modes of engagement

Current and future activities that will be engaged in are shown below:

Convey/consume	Contribute	Collaborate	Co-create
Information can be accessed via: ● FAIR4RS WG email list via RDA posts ● #FAIR4RS on Twitter ● FAIR4RS WG website via RDA ● FAIR4RS Zenodo community ● Webinars ● Newsletters from stakeholders ● FAIR4RS Github ● FAIR4RS WG Steering Committee minutes	Input can be provided through: ● Town halls ● Surveys ● Google docs ● Gitter	Participation can be achieved through: ● Gitter ● Workshops ● Google docs ● Blog & article writing ● WG meetings	Joint leadership is available via: ● FAIR4RS Steering Committee membership ● Co-leading events ● Co-creating blogs & articles

More detailed information on these activities is available in the [FAIR4RS Github](#).

4.3.4 Timeline and milestones

Milestone: Draft plan for development of guidelines for implementation, including identification of use cases, and community consultation on guidelines.	Due date: August 2021
Milestone: Implement plan and develop guidelines.	Due date: December 2021

4.4 FAIR4RS Roadmap

4.4.1 Overview

The FAIR4RS Roadmap is a ReSA-led initiative to make FAIR research software a reality. This is being undertaken as a ReSA task force, and will deliver Phase 1 of the FAIR for

Research Software Roadmap. Phase 1 will identify key stakeholders in areas arising from the application of the FAIR principles to research software, to guide strategic planning and investment.

The 2018 European Commission report, Turning FAIR into Reality, concluded that FAIR digital objects (including software) need to be supported by metrics, incentives, skills and FAIR services that provide persistent identifiers, metadata specifications, stewardship and repositories, actionable policies and Output Management Plans. Almost all of these are still to be created for software, to complement the significant FAIR data initiatives to improve use of research outputs, to increase reproducibility and to increase efficiency in research.

Phase 1 will be developed through consultation with key organizational stakeholders to enable the following outcomes:
- Mapping of existing projects that look at applying some of the elements of the FAIR principles to research software into a longer-term framework to improve strategic alignment and identify potential collaborators/leads for components of the Roadmap.
- Identification of opportunities for existing FAIR data initiatives to incorporate a focus on FAIR research software.
- Identification of Roadmap elements that are specific (or that apply in a different way) to research software and that have not been covered by FAIR data initiatives.

Phase 2 of the Roadmap will focus on implementation of the plan outlined in Phase 1. The Roadmap will enable the adoption and implementation of FAIR for research software to be fast-tracked across the research community. High-level coordination from its early stages will avoid duplication and divergent approaches. It will maximize investment outcomes, which is essential if FAIR for research software investments shadow the increasing FAIR data investments, such as the European Commission's €10 million, 3-year FAIRsFAIR initiative.

4.4.2 Community members

To lead development of the Roadmap, ReSA will facilitate consultation with key organizations and programs (including ReSA members organizations) to identify potential partners in key areas. This will build on the efforts of organizations and initiatives that are leading the way to implement elements of FAIR principles for research software in their areas of focus. Liaising with funders will also be a major part of this work, to encourage funders to align their future software investments with different parts of the Roadmap.

4.4.3 Activities and modes of engagement

Activities:
- Initial draft of roadmap based on previous work
- Identify potential partners in key areas
- Make initial contact with the initiatives to understand their focus and interest
- Convene first meetings of major groupings
- Each grouping agrees own charter (structure, aims and timelines)
- Identify resourcing opportunities
- Write all of this up as a coherent plan
- Bring together all participants in community to improve coordination
- Disseminate information on each step through ReSA channels, highlighting opportunities for involvement.

The aim of Phase 1 of the Roadmap is to empower these groupings to self-organize going forward. Appropriate resourcing of Phase 2 of the Roadmap, will aid the implementation of the Roadmap.

4.4.4 Timeline and milestones

Milestone: Document mapping existing FAIR for research software projects into a longer-term framework.	Due date: August 2021

5. Monitoring and evaluation

The success of the engagement activities from July to December 2021 will be measured based on the Commonwealth Scientific and Industrial Research Organization (CSIRO) impact model:

Inputs (resources, staff, etc.)	Activities (methodology, work, etc.)	Outputs (reports, events, etc.)	Outcomes (new practices, technology licences, etc.)	Impact (social, environmental, economic)
Grant funding to support staff to coordinate engagement activities	Engagement activities provided across the four modes of convey/consume, contribute, collaborate, co-create to maximize ways to contribute.	Newsletters, community events, online resources, task force outputs	Boost co-creation and collaboration within organizations in the community to advance the cause of research software	Better software to support better research
Metrics: Resourcing (staff hours and budget)	**Metrics:** Number of activities and participants in the four modes of engagement activities. Analysis of participant roles, geographic location and disciplinary focus	**Metrics:** Engagement activities completed Formal outputs of each task force completed Outcomes of formal evaluation of ReSA engagement (ReSA budget includes this)	**Metrics:** Size and influence of community engaging with ReSA's work	**Metrics:** Increased research software visibility and representation internationally

6. Resourcing

Resourcing is limited from July - December 2021, with 1 day a week available for ReSA's Director and Community Manager. The bulk of the work to set up the three task forces will be completed by the end of June 2021. Without identification of additional sources of funding there is a significant risk that community engagement will not be sustained or expanded.

7. Risk management

Successful participation of ReSA members in activities that support ReSA's mission, as outlined in this engagement plan, requires active and ongoing community management, diverse participation, shared purpose, the brokering and maintenance of trust, and adherence to timelines. The following table outlines some of the risk factors inherent in this work, how problems might manifest, and some mitigation strategies that can be deployed to proactively address challenges.

Risk	Likelihood	Impact	Manifests as	Mitigation strategy
Challenges in recruiting organizational members	Medium	Medium	Low number of organizational members recruited	i) Create recruitment goals and checkpoints with clear opportunities to adjust strategy; ii) Develop materials that demonstrate value. iii) Utilize Steering Committee networks. iv) Consider identifying anchor members to help recruit a second round of members.
Limited resources to manage community	High	High	Inability to deliver communications and programming in the engagement plan that are intended to build community momentum	i) Prioritize the identification of further funding; ii) Stage development to match resourcing.

Confusion on purpose and scope of community and unrealistic expectations	Low	Medium		i) Clearly define the purpose and scope of the engagement activity e.g. via notes documents, blog posts, website, and verbally at meetings, and reiterate regularly . ii) Be open about constraints, scope and limitations of the engagement; iii) feedback surveys the mechanism for members to express expectations
Community distrust	Low	Medium	Declining participation, exclusion from collaborative activities, lack of willingness to raise issues directly (but hear about them indirectly through others).	i) Identify mechanisms for members to give feedback and make suggestions and create blog posts or other communications to describe them.
Difficulty in obtaining representative participation and views	Medium	High	Homogenous suggestions or lack of divergent opinions or questions during working group meetings. Same voices dominate conversations.	i) Use code of conduct and accompanying core values to visibly emphasize the importance of diverse inputs. ii) Actively recruit participants from a range of contexts by activity leveraging networks. iii) Consider multiple ways to participate to support different member needs - including time zones,

				communication preferences.
Conflict during engagement activities	Low	Medium		Apply Code of Conduct. Acknowledge issues. Conclude the engagement and reconvene at a later date if necessary

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