

## Project Call – ScienceServe: Boosting Research Software at Helmholtz

Funded by the Helmholtz Initiative and Networking Fund

### 1 Background

The Helmholtz Association drives scientific progress through cutting-edge computational methods and software development. Such tools encompass a broad spectrum, including source code, algorithms, scripts, computational workflows, and executable programs developed specifically for or during research purposes<sup>1</sup>. As reliance on computational methods grows across all research domains, robust support for software development and maintenance is increasingly critical within the Helmholtz research ecosystem.

Scientific software fulfills diverse roles in research<sup>2</sup>, functioning as instruments, tools for data analysis, modeling complex systems, visualization, or as integral infrastructure components that control experiments or simulations. Development contexts vary greatly, from individual researchers or software engineers to collaboratively organized research communities. As a result, there is considerable variability across projects in the professionalism and maturity of software development processes.

Increasing software availability for use within scientific workflows and as accessible services, accompanied by high-quality documentation and target group specific community engagement can significantly amplify impact and foster interdisciplinary transfer – including into industry and public sectors.

### 2 The Challenge

Despite their critical role, many scientific software projects face significant challenges concerning sustainability, maintainability, and quality assurance. This requires ongoing development, maintenance, and regular updates to features, bug fixes, and adaptation to evolving hardware and software platforms.

While basic functionality is typically achieved, software projects, both within and beyond the scientific domain, face challenges in consistently implementing established good practices. These include comprehensive documentation, clear naming conventions, versioning, as well as metadata and citation standards. Important considerations such as efficient resource usage, proper attribution, and license-compliant reuse of existing software components can also be overlooked.

This Call for Proposals complements and fosters ongoing efforts, aiming to cultivate an environment conducive to the sustainable and high-quality development and management of software across Helmholtz centers.

### 3 Objectives of Funding

The goal of this call is to support projects that significantly improve the quality, long-term sustainability, reusability, and visibility of research software within the Helmholtz Association.

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<sup>1</sup> Gruenpeter, M. et al. (2021). Defining Research Software: a controversial discussion.  
<https://doi.org/10.5281/ZENODO.5504016>

<sup>2</sup> Nieuwpoort, R. van, & Katz, D. S. (2024). Defining the roles of research software (Version 2). Front Matter.  
<https://doi.org/10.54900/xdh2x-kj281>

Projects should implement and promote good practices in software engineering and foster collaboration and knowledge exchange among researchers and software developers.

Specifically, proposals should target one or more of the following objectives:

- Promote the adoption of proven research software engineering practices and methodologies to enhance accessibility, usability, maintainability, and overall software quality (e.g., version control, comprehensive documentation, testing frameworks, continuous integration, and deployment processes), including infrastructure modernization.
- Facilitate the implementation of the FAIR principles (Findable, Accessible, Interoperable, Reusable) specifically adapted to research software (FAIR4RS<sup>3</sup>).
- Foster community building and capacity development among research software developers to enhance collaboration and skill.
- Enable software originally designed for specific disciplines or applications to be adapted and utilized in other research fields or transferred to industry and public sectors.
- Advance technological maturity of scientifically valuable software, ensuring greater reliability and integration capability.

## 4 Community of Practice

The Helmholtz Association already actively supports the development of communities and good practices in Research Software Engineering (RSE) through existing initiatives such as the Forum Research Software<sup>4</sup>, the Helmholtz Software Award<sup>5</sup>, the Helmholtz Open Science Policy<sup>6</sup>, and the Model Policy on Sustainable Software<sup>7</sup>, as well as the forthcoming quality indicators for research data and software publications within the PoF framework.

In addition to individual project objectives and together with the key stakeholders at Helmholtz, the ScienceServe initiative supports the Helmholtz-wide community of practice in research software development. These key stakeholders include the Helmholtz Information & Data Science platforms<sup>8</sup>, in particular HIFIS - Helmholtz Federated IT Services<sup>9</sup>, the Helmholtz Open Science Office<sup>10</sup>, the Helmholtz Working Group on Open Science with its Task Groups “Research Software” and “Helmholtz Quality Indicators for Data and Software Products”<sup>11</sup>, and the Joint Lab HIRSE<sup>12</sup> (Helmholtz Information - Research Software Engineering).

We encourage all funded projects to get in touch with these stakeholders and join the Helmholtz community of practice in research software development. Towards the end of 2026, we will invite all projects to an event where they can share progress and discuss their insights and experiences.

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<sup>3</sup> Barker, M., Chue Hong, N. P., Katz, D. S. et al. (2022). Introducing the FAIR Principles for research software. In Scientific Data (Vol. 9, Issue 1). <https://doi.org/10.1038/s41597-022-01710-x>

<sup>4</sup> <https://os.helmholtz.de/en/open-research-software>

<sup>5</sup> <https://www.helmholtz-hida.de/hida/helmholtz-software-award>

<sup>6</sup> <https://os.helmholtz.de/open-science-in-helmholtz/open-science-policy>

<sup>7</sup> <https://os.helmholtz.de/open-research-software/muster-richtlinie>

<sup>8</sup> <https://www.helmholtz.de/forschung/im-fokus/information-data-science>

<sup>9</sup> <https://www.hifis.net>

<sup>10</sup> <https://os.helmholtz.de>

<sup>11</sup> <https://os.helmholtz.de/en/open-science-in-helmholtz/working-group-open-science>

<sup>12</sup> <https://www.helmholtz-hirse.de>

## 5 Eligibility

The call is open to Helmholtz researchers, software engineers, and teams affiliated with Helmholtz research centers. Collaborative proposals involving more than one Helmholtz Center are strongly encouraged and will be given priority in the selection process. Applicants involved in previous INF-funded projects associated with Helmholtz platforms for information and data science are explicitly invited to participate.

## 6 General requirements

ScienceServe welcomes software projects at various maturity levels. Nevertheless, competitive proposals should clearly:

- Demonstrate how their project aligns with the Helmholtz mission and its potential to tackle major societal challenges;
- Gather user requirement specifications and articulate the expected impact of software improvements on the research community;
- Present an outline for future maintenance, sustainability, and developer community involvement beyond the funded period;
- Showcase a competent project consortium and a realistic work plan, detailing clear goals, measurable milestones, and feasibility assessments;
- Indicate any potential infrastructural needs (e.g., computing resources, data storage) and outline approaches to fulfill these requirements, considering available Helmholtz services, such as HIFIS, HAICORE etc.

## 7 Evaluation criteria

Applications will be evaluated based on the dimensions outlined by the Helmholtz Quality Indicator for Research Software<sup>13</sup>, which provides a Helmholtz-wide standard for assessing research software quality. This indicator encompasses six dimensions, integrating the FAIR4RS principles with two additional categories: scientific and technical basis (FAIR-ST). In addition, applications should also consider community building among developers, outline plans for sustaining activities beyond the project's funding period, and demonstrate the overall soundness of the project.

Applicants must submit a concise **self-description** that positions their project within the framework of the evaluation criteria. Building on this description, applicants are expected to explicitly detail how their project will **enhance specific dimensions of the evaluation criteria**. Addressing scientific relevance, an outline for intermediate-term operation, and overall project soundness is mandatory. If the proposed project forms part of a broader initiative, applicants should clearly describe this relationship and explain how the requested funding integrates into the larger structure.

The proposed **improvements should be coherent** and collectively provide a **compelling justification for the funding amount requested**. Based on the submitted self-description, the reviewers will assess both the current maturity level of the software and the anticipated progress achievable through the proposed activities.

Evaluation will specifically consider the following aspects:

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<sup>13</sup> zu Castell, W., Dransch, D., Juckeland, G. et al. (2024). Towards a quality indicator for research data publications and research software publications – a vision from the Helmholtz Association. In F1000Research (Vol. 13, p. 471). <https://doi.org/10.12688/f1000research.147663.1>

1. **Scientific Relevance**, alignment with Helmholtz's mission and the projects potential to tackle major societal challenges, evidence of scientific advancement that the software supports, proven demand from the research community for improvements in existing software (e. g. through support letters), adherence to community standards. The strongest proposals will demonstrate explicit connections to broader scientific initiatives and proactive engagement with evolving standards.
2. **Technical Basis**, encompassing robust project management practices, well-organized repository structures and collaboration mechanisms, coherent and standardized code structure, transparent and accountable processes for code changes, clear documentation of code, deployment infrastructure and systematic implementation of security measures.
3. **Findability**, emphasizing structured publication and dissemination practices, clear versioning strategies, use of persistent identifiers (PIDs), and comprehensive metadata management to facilitate discoverability and reuse.
4. **Accessibility**, straightforward processes for obtaining and utilizing software, user-friendly software interfaces, user support availability, and accessible, ideally automated, deployment packages, providing software-as-a-service.
5. **Interoperability and Reusability**, focusing on the adoption of open or at least widely accepted input/output data standards, flexible integration options into diverse workflows, clear licensing terms (preferably OSI-approved<sup>14</sup>). Also includes the transfer of research software solutions to new domains, industry, or the public sector.
6. **Community building and outline for intermediate-term operation (for at least one year after end of project funds)**, involvement of the developer community, establishing governance structures, creating tutorials, organizing workshops and hackathons, improving community-oriented documentation, continuous updating, and technical provision of the resources.
7. **Project Soundness**, evaluating the clarity, feasibility, and ambition of the project work plan, realistic and measurable outcomes, defined goals and milestones, and demonstrated capability or explicit strategy to achieve necessary expertise.

## 8 Application Process and Formal Criteria

Applicants are encouraged to consult the Helmholtz Information & Data Science platforms or experts within their networks for advice on software development best practices prior to submission. All funded projects are recommended to consult HIFIS for guidance on sustainable strategies and good practices for providing and maintaining project results (e.g. Helmholtz Cloud, Research Software Directory, etc<sup>15</sup>). However, ultimate responsibility for ensuring the long-term provision and maintenance of project outcomes remains with the project teams themselves.

All applications must include:

- A concise cover page with project title and acronym, abstract, up to 10 keywords, contact details of the coordinator(s) and Principal Investigator(s), including department/ institute/ section and research group, participating centers and external partners (if applicable);
- A main proposal body (max. 5 pages) clearly addressing each evaluation criterion;

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<sup>14</sup> <https://opensource.org/licenses>

<sup>15</sup> <https://www.hifis.net/services>

- An appendix with work packages, deliverables, milestones, CVs, budget plans, and matching fund declaration from the participating center(s).

Applications must adhere to specified formatting guidelines (DIN A4, Arial 11pt, single line spacing, 2.5 cm margins). A template with detailed instructions on structure and formatting can be found in the appendix to this call.

The main part of the proposal, including a cover page, and the appendices to the proposal must be submitted as PDF documents via the ProMeta platform. Instructions for submission via ProMeta will be provided.

CVs should emphasize relevant expertise and highlight accomplishments beyond traditional metrics, such as software contributions, published data sets, awards, or industry collaborations.

A declaration, usually a signed letter, from the board of directors of the participating centers must be enclosed, guaranteeing that the own funds are at least equal to the amount requested from the INF.

Incomplete applications or those submitted simultaneously to other funding schemes will be excluded from the evaluation process.

## 9 Funding Conditions

The funding must be fully utilized within the year 2026.

Each project can apply for up to 150,000€ from the Initiative and Networking Fund (INF)<sup>16</sup>. Participating centers must provide matching funds equivalent to the INF contribution. The contribution by participating Helmholtz centers has to be confirmed by a signed letter from the board of directors, by either the administrative, the scientific director or both, when submitting the proposal.

Staff, travel expenses and cost for consumables are eligible for funding; investments are excluded. Funding will be assigned for Helmholtz centers only. The funds will not be eligible for overhead costs. In the case of cooperation between centers, a maximum of 70% of INF funds can be awarded to a single Helmholtz center.

All projects must comply with INF guidelines regarding funding utilization and reporting requirements. At the end of each project, a report must be submitted on the use of the funds as well as on the course of the project and its results.

Projects funded by ScienceServe are expected to achieve significant advancement in areas, such as software sustainability, quality improvement, community engagement, and interoperability. Projects will contribute strategically to the Helmholtz community of practice in research software development, benefiting from support offered by the Helmholtz Framework Information & Data Science platforms, the Helmholtz Open Science Office, and the Joint Lab HIRSE.

In alignment with the Helmholtz Open Science Policy and in accordance with good scientific practice, all developed software must be openly licensed, deposited in a public repository, and indexed in the Helmholtz Research Software Directory (RSD). Any exceptions to this requirement must be clearly documented and thoroughly justified within the proposal. Additionally, all associated research data and academic publications resulting from the funded projects must be made openly accessible under open licenses at the time of their publication.

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<sup>16</sup> <https://www.helmholtz.de/en/about-us/structure-and-governance/initiating-and-networking>

## 10 Evaluation process, selection, and evaluation criteria

Proposals must be submitted by June 30, 2025.

Proposals will be submitted through the ProMeta platform at: <https://ivf.helmholtz.de>

Proposals will undergo an initial formal eligibility check, followed by a pre-assessment conducted by an independent expert panel. This panel will review and evaluate each proposal based on clearly defined criteria without oral presentations. A ranked list of proposals will then be prepared, from which the Helmholtz president will make the final funding selections.

Proposals will be evaluated based on the following evaluation criteria:

Evaluation criterion	Aspects evaluated
<b>Scientific Relevance</b>	<ul style="list-style-type: none"> <li>• Alignment with Helmholtz's mission and the projects potential to tackle major societal challenges</li> <li>• Demonstrated scientific advancement potential</li> <li>• Proven demand from the research community for improvements in existing software (e. g. through support letters)</li> <li>• Alignment with community standards</li> <li>• Clear contributions to ongoing scientific initiatives</li> </ul>
<b>Technical Basis</b>	<ul style="list-style-type: none"> <li>• Robustness of project management practices</li> <li>• Well-organized repository structure and collaboration mechanisms</li> <li>• Coherent and standardized code structure</li> <li>• Transparent and accountable processes for code changes</li> <li>• Clear documentation of code</li> <li>• Deployment infrastructure</li> <li>• Systematic implementation of security measures</li> </ul>
<b>Findability</b>	<ul style="list-style-type: none"> <li>• Structured software publication and dissemination practices</li> <li>• Clear versioning</li> <li>• Use of persistent identifiers (PIDs)</li> <li>• Comprehensive metadata management to facilitate discovery and reuse</li> </ul>
<b>Accessibility</b>	<ul style="list-style-type: none"> <li>• Straightforward processes for obtaining and utilizing software</li> <li>• User-friendly software interfaces</li> <li>• User support availability</li> <li>• Accessible, ideally automated, deployment packages.</li> <li>• Providing software-as-a-service</li> </ul>
<b>Interoperability and Reusability</b>	<ul style="list-style-type: none"> <li>• Adoption of widely accepted input/output data standards</li> <li>• Flexible integration options into diverse workflows</li> <li>• Clear licensing terms (preferably OSI-approved)</li> <li>• Transfer of research software solutions to new domains, industry, or the public sector</li> </ul>

<b>Community building and outline for intermediate-term operation</b>	<ul style="list-style-type: none"> <li>• Outline for at least one year after end of project funds, regarding the technical provision of the resources and continuous updating</li> <li>• Availability of the software for use within scientific workflows</li> <li>• Strategy for the involvement of the developer community, establishing governance structures, creating tutorials, organizing workshops and hackathons, improving community-oriented documentation</li> </ul>
<b>Project Soundness</b>	<ul style="list-style-type: none"> <li>• Clarity, feasibility, ambition of the proposed work plan</li> <li>• Realistic and measurable outcomes</li> <li>• Clearly defined goals and milestones</li> <li>• Demonstration of the project consortium's capability through relevant previous achievements or, if experience is lacking, a clear strategy to acquire necessary expertise</li> </ul>

## 11 Schedule

Date	Event or action
28 April 2025	Call for proposals published
06 May 2025	Information meeting, agenda and registration: <a href="https://events.hifis.net/event/2559/">https://events.hifis.net/event/2559/</a>
30 June 2025	Application submission deadline, submissions are accepted via the ProMeta platform: <a href="https://ivf.helmholtz.de/">https://ivf.helmholtz.de/</a>
Until end of September 2025	Proposal evaluation by expert panel; final funding decision by the president
October until December 2025	Preparation and finalization of funding contracts between Helmholtz Association and participating centers
From January 2026	Start of funded ScienceServe projects

## 12 Contact information

For further details and inquiries, please contact [nina.weisweiler@helmholtz.de](mailto:nina.weisweiler@helmholtz.de).

We look forward to receiving innovative proposals that contribute to the advancement of sustainable and high-quality scientific software within the Helmholtz Association.

## 13 Appendices

- Annex 1: Template for cover page and project proposal
- Annex 2: Template for lists of works packages, deliverables, and milestones, Gantt chart, budget table, CVs, and confirmation letters
- Annex 3: Data protection information