



Call for Sustainable Software 2023 (SS 2023)

Enhancing successful
research software

netherlands
eSciencecenter





1 Introduction

1.1 Purpose of this call

This call for proposals supports communities of researchers who require their software to meet higher quality standards to ensure the continuity and advancement of their research in the longer term.

Proposals should meet one or more of these objectives:

- making successful research software applicable to disciplines or research problems other than those from which the software first emerged;
- improving the accessibility of successful research software (e.g. through packaging and release, enhanced user interfaces, or research-software-as-a-service);
- enhancing the Technology Readiness Level of successful research software;
- further developing research software to support the formation of a community of researchers and developers;
- engaging in community building activities (e.g. through setting up a governance model, creating tutorials, organizing workshops or hackathons, or improving documentation).

A competitive proposal should:

- make clear why an improvement of existing research software is demanded from the research community, and why this improvement requires the eScience Center's research software expertise;
- explain the nature of, and the expected impact on, the research communities that requires the improved research software;
- include a clear strategy for the future maintenance and sustainability of the research software resulting from the project (including the involvement of relevant communities), and a realistic and concrete plan describing the measures that will be taken to ensure its usability and availability beyond the duration of the project itself.

This call is open to applicants from all disciplines; for eligibility, please check section 2.1. Full proposals will be co-authored by the Netherlands eScience Center.

1.2 About the Netherlands eScience Center

The Netherlands eScience Center is the national centre for innovative software solutions in academic research. Established in 2012 as an independent foundation, it receives its funding from NWO and SURF. The eScience Center aims to bridge the gap between digital technologies on the one hand and scientific and scholarly inquiry on the other. Its vision is to establish a robust research community, in which all investigators in all domains are able to exploit advanced digital technologies and research software to answer innovative research questions, keeping the Netherlands at the forefront of cutting-edge international research.



The eScience Center employs more than sixty Research Software Engineers or RSEs. As experts in digital technologies and methodologies, they are the equivalents of postdocs, assistant and associate professors, and top-level technicians at universities. In addition to their specific focus on the development of advanced research software, RSEs at the eScience Center will help applicants interpret the results of their research and help make the tools and methods that emerge from the project (re)usable for the wider research community. They will co-author research and methodological publications together with members of the research team. Based at the Netherlands eScience Center in Amsterdam, RSEs perform their project activities both remotely and at project locations.

1.3 eScience Center expertise

Awarded projects are offered an in-kind investment in expertise in the form of RSEs employed by the eScience Center. To maximize the added value and impact for applicants, the technological needs and requirements of the project should match with the Center's expertise. Its current expertise areas are:

- AI: machine learning, image processing;
- Analytics: big data analytics, text analysis, visualization;
- Data processing: databases, real-time data analysis, interoperability and linked data;
- Computing: exploitation of hardware accelerators, high performance computing, cloud computing, combining simulations;
- Software quality: developing workflow technologies, improving software practices, advancing software sustainability.

For an overview of the eScience Center's expertise areas, see Appendix B (eScience Center Expertise) or [our website](#). For an overview of the research software that has been developed and contributed to over the past few years, see software.esciencecenter.nl.

1.4 Available person years

The call makes available in-kind support by allocating to the awarded projects time of Research Software Engineers (RSEs) employed by the eScience Center. The eScience Center's in-kind contribution is calculated in 'person years' or PYR, where 1.0 PYR represents 1,536 hours of RSE time available for the duration of the project.

The total available in-kind budget for this call is approx. 4.0 PYR. Applicants may request 2.0 PYR, so that a maximum of 2 projects is expected to be awarded through this call.

Only proposals that are assessed as 'excellent' or 'very good' will be eligible for awarding.

The duration of a project is 18 to 24 months. The eScience Center will allocate RSEs to carry out the research proposal. Note that when a project starts, the project structure as outlined in the proposal may need to be adjusted; this will always happen in consultation with the Lead Applicant.



In operational and administrative terms, projects are overseen by eScience Center's programme managers, who share responsibility with the applicant for monitoring progress and facilitating the delivery of project results.

Of the total requested PYR, 15% covers project management, as well as organizational and professional development activities of RSEs (training, work meetings, conferences, etc).

1.5 Validity of this call

This call for proposals is valid for proposals submitted before the deadline of the Project Proposition, until the Board of the Netherlands eScience Center has taken the final decision, as specified in the assessment procedure.



2 Guidelines for applicants

2.1 Who can apply?

Each proposal is to be formally submitted by a single named researcher (henceforth the ‘Lead Applicant’ or LA). The proposal needs to be written together with a senior member of the eScience Center, to ensure that the envisaged project aligns with eScience Center expertise and addresses the appropriate technological options. The LA represents a larger community of researchers and will act as primary contact for the eScience Center.

The LA must

- be employed by a Dutch research performing organization. An overview of all eligible organizations is included in Appendix A.
- be in possession of a PhD;
- hold a permanent contract;
- ensure a minimal personal commitment to the project work for half a day per week on average for the duration of the project.

The activities of the research team, including eScience Center RSEs, should be integral to the proposed project structure. Proposals supported by large research infrastructures and/or research consortia will be positively valued. Researchers employed by research organizations not mentioned in Appendix A may also participate in the consortium.¹

The LA is allowed to submit only one proposal in that capacity in this call.

2.2 What can be applied for?

A project may be requested for an in-kind budget of 2.0 PYR. The project duration should be between 18 and 24 months.

The organization of one substantial workshop is mandatory. The main goals of the workshop should be to discuss new use cases for the software, foster and augment the research community making use of the software, and explore options for increasing software sustainability. The format and costs of the workshops should be negotiated with the eScience Center. Expenses of up to 15,000 EUR will be covered.

¹ Employees of institutes for higher education (vereniginghogescholen.nl/hogescholen) may also participate in a research team.



2.3 When can applications be submitted?

Project Proposition:

Applicants are required to submit a Project Proposition before they can submit a Full Proposal. The closing date for the submission of Project Propositions is Thursday 16 March 2023, 14:00 CET.

Full Proposal:

The closing date for the submission of Full Proposals is Thursday 8 June 2023, 14:00 CET.

2.4 Software Management Plan

A Software Management Plan must be submitted together with the Full Proposal. The Software Management Plan needs to specify how the sustainability (long-term storage, dissemination, use and re-use) of the research software during and after the project's completion will be ensured, and for which period of time.

There is no one-size-fits-all solution for software sustainability. Different possibilities and combinations are acceptable. For some examples of measures and strategies please consult the Software Management Plan template; note that the list in that template is not exhaustive.

The Software Management Plan should be completed using the appropriate template available on the eScience Center website www.esciencecenter.nl/calls-for-proposals.

It is encouraged, though not required, to include one or more letters of support from software sustainability partners, such as an institute providing long term support for the software, or a research infrastructure in which the software will be integrated.

2.5 Specific conditions

The following general conditions apply to all full proposals:

- An identical proposal may not have been submitted or awarded elsewhere.
- The proposal must match with the eScience Center's areas of expertise (see Section 1.3).
- Components (such as software, data sets or specialized hardware) necessary for starting or continuing the proposed research must be available at the date specified in the project structure outline in the application form.
- Awarded projects must commence within twelve months after the awarding date. The starting date of the project will be determined by the eScience Center in consultation with the LAs.



Furthermore, the following conditions apply:

Software and data accessibility and quality

The eScience Center expects a basic level of accessibility and quality for the data and software used in its projects. In all cases where existing data and software serve as starting points of the research, applicants must provide convincing arguments that they are usable. See the application forms for more information.

Open Science

Open Science is central to the eScience Center. Open Science enables verification, reproducibility, and transparency in all phases in the research process, and maximizes the chance for adoption, reuse and impact of outputs resulting from the projects.² When writing the project proposal, the LA should be aware that:

- All source code will use permissive open-source licenses. Software will be published in publicly accessible repositories such as GitHub, allowing community contributions. Software also will be made available in the Research Software Directory (software.esciencecenter.nl), so as to make the software findable for search engines, provide citation options and add relevant metadata (such as documentation and related projects, tools and publications).
- Reproducible research is supported (e.g. by using workflow technologies, computational notebooks, virtual environments, container solutions), so that researchers with access to the data and software are able to reproduce the research results.
- All research data and academic publications resulting from research awarded under this call for proposals are to be freely publicly accessible, at the earliest possible stage (in open access) under open licences, at the time of publication.

Requirements regarding digital infrastructure

Applicants are asked to indicate the project's infrastructural needs (if any), in terms of computing power, data storage capacity, fast data transfers, or otherwise, and explain how they expect to fulfil those needs.

The Dutch national infrastructure includes facilities offered by SURF and DANS. For more information, it is advisable to contact the organizations and institutes responsible for these resources directly, in particular SURF (surf.nl) and DANS (dans.knaw.nl). Proposals may suggest the use of local, international and/or commercial (e.g. web, cloud, etc.) hardware and services. In all cases a brief explanation of the choice for specific infrastructures is required.

In case the project is awarded, any required access to the Dutch national infrastructure needs to be arranged by the LA after the start of the project using the relevant procedures. The eScience Center can assist, if necessary.

² nwo.nl/en/open-science



2.6 Submitting the application

The Full Proposal should be submitted in collaboration with a senior member of the Netherlands eScience Center. After the project proposition phase (see 3.1) each LA will be connected to a senior member of the eScience Center, who will represent the eScience Center and act as co-author of the proposal, actively supporting and advising the LA on technological options. The work of co-authors will be supervised by the Director of Technology of the eScience Center. Co-authors from the eScience Center may collaborate on one proposal only.

Furthermore, the following conditions apply:

- Applications (covering the proposal itself and the Software Management Plan) must be completed in English.
- Use of the application forms (Project Proposition Template and Full Proposal Template) from the eScience Center website is obligatory.
- Project Propositions and Full Proposals can be submitted only via NWO's electronic application system ISAAC: www.isaac.nwo.nl. For technical questions, contact the ISAAC helpdesk (see Section 4).
- Project Propositions and Full Proposals must be submitted no later than the deadlines set in Section 2.3.
- As part of the submission process in ISAAC, you may be requested to provide additional information. Please take this into account with regard to the set deadline.
- Please take into account that the proposal summary provided in ISAAC, and the summary for non-experts, may be used for publication purposes, should your application be awarded.
- Please note that applicants should inform their employing institute of the submission by sending a copy of the Project Proposition and the Full Proposal to the director or dean of the department/institute. It is therefore assumed that the employing institute or university is informed of, and accepts, this call's conditions.
- Possible letters of support or intent from relevant stakeholders, including research communities, software sustainability partners, and private partners, should be added to the ISAAC fact sheet in a separate PDF file in ISAAC as an attachment to the application form.



3 Assessment procedure

3.1 Procedure

The evaluation and selection procedure consists of three main steps. NWO will be involved to guarantee proper procedure. The procedure is intended to be as light-weight as possible.

Information Event

To inform interested applicants of the specific aims of this call for proposals, and of the role and expertise of the eScience Center RSEs, an Information Event will be organized on Tuesday 21 February 2023 (13:00-15:30). The event will take place online. More information can be found on www.esciencecenter.nl/calls-for-proposals.

Step 1: Project Proposition

The Project Proposition stage is intended to select the proposals that may proceed to Step 2 (the Full Proposal stage).

The Project Proposition should be submitted to the eScience Center using the appropriate template (www.esciencecenter.nl/calls-for-proposals). Project Propositions must be submitted before the closing date for submission of Project Propositions mentioned in section 2.3. It is important that the LA should already make certain at this stage that all the conditions mentioned in Section 2 can be met realistically.

The eScience Center will select propositions that best match the call (based on the objectives listed in Section 1.1) and will also take into account the results of the software and data accessibility and quality checks. At most six propositions will be selected. The outcome is binding.



Step 2: Full Proposal phase and assessment

Full Proposals will be co-authored by all selected LAs and senior members of the eScience Center. To start the writing process, LAs will be invited for personal consultation by the eScience Center. This will result in a fitting partnership with a eScience Center employee and a collaborative effort to write the Full Proposal. On completion of the proposal, it is the LA's responsibility to submit it. Full Proposals must be submitted before the closing date for submission of full proposals mentioned in section 2.3. The following procedure will then be adhered to:

Eligibility check

A formal eligibility check will be performed by the eScience Center and NWO regarding the eligibility of the LA, the correct completion of the template, the inclusion of the signed commitment, the extent to which the conditions mentioned in Sections 2.5 and 2.6 have been met.

Panel assessment

An assessment panel of external experts will assess the proposals. The assessment will be based on the criteria outlined in Section 3.2 and will also take into account the Software Management Plan. The assessment panel will rank the proposals on the basis of their scores. The ranking will be submitted, together with a recommendation, to the Board of the Netherlands eScience Center.

Step 3: Awarding decision

The Board of the Netherlands eScience Center formally decides on the awarding of projects based on the assessment panel recommendations. The findings of the assessment panel will be sent to the applicants.

Timetable

21 February 2023	Information Event
16 March 2023, 14:00 CET	Deadline Project Proposition
March-April 2023	Eligibility check, selection, and notification
April-May 2023	consultation meetings
8 June 2023, 14:00 CET	Deadline Full Proposal
June 2023	Eligibility check
September-October 2023	Panel assessment
November-December 2023	Applicants informed of final decision



3.2 Assessment criteria

Project Proposition phase

To proceed to the selection phase, Project Propositions should make clear that they meet the requirements listed in Section 1.1.

Full Proposal phase

Proposals will be assessed by the assessment panel based on the criteria below:

Technological quality and state-of-the-art (34%)

- the proposal must indicate the technological and/or methodological challenges that need to be overcome;
- the proposal should discuss relevant existing technologies and methodologies;
- the proposal must indicate how the proposed work is connected with efforts within the broader research community;
- the research team including the LA should make clear its availability for, and track record concerning, a collaborative effort, and argue why this is sufficient on the basis of a realistic project structure outline.

Impact (33%)

- the proposal must indicate which outcomes the projected software solution(s) are expected to lead to;
- the proposed research should potentially change the modus operandi in one or more research disciplines, in terms of broadness, scale, speed of result delivery, or otherwise;
- the proposal must indicate which efforts are made to promote the results of the project, in terms both of academic publication and of research community (demonstrations, posters, presentations, workshops, training, etc.).

Re-use and sustainability (33%)

- the proposal must indicate how the technology and software will find use beyond the proposed work itself, preferably across institutional, national or disciplinary borders, both during and after finalization of the project;
- the technological and software deliverables should be easily accessible, useable and interpretable by other researchers and developers;
- the proposal must indicate how the project will build further collaborations, in academic research, industry, or both;
- the proposal must indicate how long-term maintenance and sustainability of project results (in particular software and data) will be secured and managed.



4 Contact details

Specific questions about this call

If you have specific questions about this call for proposals and the assessment procedure, please contact:

Sam Woldringh, Program Officer NWO

Tel.: +31 (0)70 349 4101

Email: e-science@nwo.nl

For questions about the Netherlands eScience Center, or the eScience requirements for this call, please contact:

Programme Management Netherlands eScience Center

Tel.: +31 (0)20 460 4770

Email: open-calls@esciencecenter.nl

Questions about ISAAC

For technical questions about the electronic application system ISAAC, please contact the ISAAC helpdesk. Applicants are requested to read the ISAAC manual before consulting the helpdesk.

The ISAAC helpdesk is available from Monday to Friday from 10:00 to 17:00 hours on +31 (0)20 346 7179. You can also send your questions to isaac.helpdesk@nwo.nl. You will receive a reply within two working days.

The eScience Center adheres to NWO's Code for Dealing with Personal Interests (see nwo.nl/en/code-dealing-personal-interests).



Appendix A

Eligible organizations

1. Universities

Erasmus Universiteit Rotterdam
Open Universiteit Nederland
Protestantse Theologische Universiteit
Radboud Universiteit Nijmegen
Rijksuniversiteit Groningen
Technische Universiteit Delft
Technische Universiteit Eindhoven
Theologische Universiteit Apeldoorn
Theologische Universiteit Kampen
Universiteit Leiden
Universiteit Maastricht
Universiteit Twente
Universiteit Utrecht
Universiteit van Amsterdam
Universiteit van Tilburg
Universiteit voor Humanistiek
Vrije Universiteit Amsterdam
Wageningen Universiteit en Researchcentrum

2. University Medical Centers

Amsterdam UMC (locations: AMC and VUMC)
Erasmus MC
Leiden UMC
Maastricht UMC+
Radboud UMC
UMC Groningen
UMC Utrecht



3. KNAW institutes

Hubrecht Instituut voor Ontwikkelingsbiologie en Stamcelonderzoek

Huygens ING

Internationaal Instituut voor Sociale Geschiedenis (IISG)

Koninklijk Instituut voor Taal-, Land- en Volkenkunde (KITLV)

Meertens Instituut

Nederlands Herseninstituut

Nederlands Instituut voor Ecologie (NIOO)

NIOD Instituut voor Oorlogs-, Holocaust- en Genocidestudies

Nederlands Interdisciplinair Demografisch Instituut (NIDI)

Westerdijk Fungal Biodiversity Institute

4. NWO institutes (NWO-I)

AMOLF - Physics of Functional Complex Matter

ARCNL - Advanced Research Center for Nanolithography

ASTRON - Netherlands Institute for Radio Astronomy

CWI - Centrum Wiskunde & Informatica

DIFFER - Dutch Institute for Fundamental Energy Research

Nikhef - Nationaal instituut voor subatomaire fysica

NIOZ - Koninklijk Nederlands Instituut voor Onderzoek der Zee

NSCR - Nederlands Studiecentrum Criminaliteit en Rechtshandhaving

SRON - Netherlands Institute for Space Research



Appendix B

eScience Center Expertise

The Netherlands eScience Center has advanced expertise in the following areas:

Software quality

- developing workflow technologies: setting up an optimal and reproducible workflows
- improving software practices: robust programming to enable reuse
- advancing software sustainability: embedding software in the open science community

AI

- machine learning: using data to train computer models
- image processing: understanding patterns in images and video

Analytics

- big data analytics: exploring large volumes of complex data
- text analysis: understanding patterns in texts
- visualization: creating images to drive interpretation

Data processing

- databases: making data accessible and searchable
- real-time data analysis: processing sensor data ultra-fast
- interoperability and linked data: interconnecting data sets

Computing

- exploiting hardware accelerators: increasing speed at lower cost
- high performance computing: increasing computational scale
- cloud computing: easily accessing computing power
- combining simulations: replicating complex systems

For more information, see also www.esciencecenter.nl/where-we-focus.