

netherlands

eScience center

Open eScience Call 2021: Early Career & Spearhead Projects

**Empowering researchers
across all disciplines through
advanced research software**



1 Introduction

1.1 Purpose of this call

This call for proposals supports research that requires the development and application of advanced digital technologies and research software. The projects should address an urgent methodological research challenge that can count on broader support from the research community in which the applicants are active. The call reflects the eScience Center's strategy to advance the use of sustainable research software in academic research.

In this call, 'research software' refers to digital tools, methods or algorithms that contribute to the creation and/or analysis of research data and research results. Applicants are invited to propose a research problem that requires a digital solution of this kind.

Projects receive an in-kind investment rather than funding. This means that a dedicated team of research software engineers (RSEs) from the eScience Center will work together with the applicants to improve or build research software within the context of a larger research community, and as integral members of a research team. This call offers two types of projects: early career projects and spearhead projects.

A competitive proposal should

- make clear why new or improved research software is required to solve the stated research problem
- explain how the proposal strengthens and connects to research communities that require, and may be expected to contribute to, the research software
- include a clear strategy for the future maintenance and sustainability of the research software resulting from the project, and a work plan describing the measures that will be taken to ensure its usability and availability beyond the duration of the project itself.

Applicants may submit a proposal in one of the following discipline areas.

- Physical Sciences and Engineering (mathematics, physics, astrophysics, chemistry, engineering, earth sciences, agricultural sciences, environmental sciences, computer science)
- Life Sciences (biology, medical and health sciences, neuroscience)
- Social Sciences and Humanities (economics, political sciences, law, sociology, anthropology, education sciences, communication studies, psychology, linguistics, philosophy, literary studies, archaeology, history, human geography)

1.2 About the eScience Center

The Netherlands eScience Center is the national centre for innovative software solutions in academic research. It was established in 2011 as an independent foundation and 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 research questions, keeping the Netherlands at the forefront of cutting-edge international research.

The eScience Center employs about fifty Research Software Engineers or RSEs. As experts in digital technologies and methodologies, they may be seen as 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 make the tools and methods that emerge from the project (re-)useable 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.

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.

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. In close collaboration with applicants, RSEs will develop and improve the research software best suited to solving the research questions described in the project proposal.

To maximize the added value and impact for applicants, the technological needs and requirements of the project should match with the expertise of the eScience Center. Broadly defined, the Center's current areas of expertise include:

- 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). For an overview of the research software that has been developed and contributed over the past few years, see software.esciencecenter.nl.

1.4 Available person years

This call offers two options, which are explained further in Sections 2.1 and 2.2:

1. Early career projects
2. Spearhead projects

The call makes available in-kind support by allocating the time of Research Software Engineers (RSEs) employed by the eScience Center to the project. The eScience Center's in-kind contribution is calculated in 'person years' or PYR, where 1.0 PYR represents 1,620 hours of RSE time available for the duration of the project.

The total available budget for 2021 is approx. 24 PYRs.

- for early career calls 6 projects may be awarded, with a 1.0 PYR available per project
- for spearhead calls 9 projects may be awarded, with 2.0 PYR available per project

For early career projects the maximum duration of a project is 18 months, for spearhead projects the maximum duration of a project is 36 months. Note that when a project starts, the work plan may need to be adjusted; this will always happen in consultation with the applicant.

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

1.5 Validity of this call

This call for proposals is valid for proposals submitted before the deadline of **Thursday 6 May 2021, 14:00:00 CET**, until the board of the eScience Center has taken the final decision, as specified in the assessment procedure.

2 Guidelines for applicants

2.1 Who can apply?

Proposals can be submitted by researchers from a Dutch research performing organisation. All eligible organisations are included in Appendix A (Eligible organisations).

Each proposal is to be formally submitted by a single named researcher (henceforth the 'lead applicant' or LA). The LA will act as primary contact for the eScience Center.

In the case of the spearhead projects a proposal is submitted by the LA on behalf of a group of researchers (the 'research team'). To encourage the practice of open science and collaboration across organisations, at least one team member should be based at a research performing organisation other than that of the LA. Team members may also be employed by research organisations not mentioned in Appendix A.¹

The LA must

- be in possession of a PhD
- hold a permanent contract (for spearhead projects) or hold a contract for at least the duration of the requested project (for early career projects)
- ensure a minimal personal commitment of 0.3 fte per year to the project
- have demonstrable knowledge and experience in applying digital methodologies to research

The activities of the lead applicant and the research team should be integral to the proposed work plan. Public-private collaborations are possible, but the inclusion of industrial partners as part of the research team is not a requirement.

The LA may submit only one proposal in that capacity in this call. Persons who are involved in an awarded eScience Center ASDI 2020 Call proposal in the capacity of lead applicant ('principal investigator') or co-applicant may not submit in this call.

2.2 What can be applied for?

This call offers applicants two options to choose from: early career and spearhead (see Table 1).

- 1 Early career projects are open exclusively for researchers at an early stage in their career.
- 2 Spearhead projects are open for all researchers.

Each project must include one or more workshops, as specified below. Workshops are focused, participatory events with the aim of creating or fostering a community of researchers, including (potential) users, around the digital technologies and research software produced within the project. Workshops will be paid for by the eScience Center.

1. Early career projects

Early career projects are targeted at lead applicants who are at an early stage of their academic career. Lead applicants must have obtained their doctorate within the last six years; this call is open to

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

researchers who meet this criterion on 1 January 2021. The eScience Center applies NWO's extension clause for parents.² A request for extension, to be made directly to the eScience Center, must be approved before submission of the full proposal.

An early career project may request an in-kind budget of 1.0 PYR. The project duration should be between 12 and 18 months.

If successful, early career LAs must write a proposal for a workshop aimed at building a research community around the project's software. The workshop proposal is not part of the full proposal; it should be written after the project is awarded but prior to the start of the project. The eScience Center will cover the costs of the workshop. For all early-career projects, the eScience Center has set up a cooperation with the Lorentz Center, which hosts prestigious international meetings of typically one week, characterized by an open and interactive atmosphere.³ The eScience Center will help applicants submit their workshop proposal to the Lorentz Center.

2. Spearhead projects

Spearhead projects are open to all researchers. They involve a community of multiple researchers (PhDs, postdocs, tenured research and support staff) from more than one research performing organization. A spearhead project may be requested for an in-kind budget of 2.0 PYR. The project duration should be between 24 and 36 months.

The eScience Center will cover the costs for the organisation of at least two substantial mandatory workshops. Successful LAs should negotiate the format and costs of the workshops with the eScience Center.

Table 1. Overview of options in the Open eScience Call

	Early career projects	Spearhead projects
Requirements	PhD not longer than 6	Have a PhD
	Single applicant, team	Team members required
Conditions	12-18 months duration	24-36 months duration
	1 PYR in-kind support	2 PYR in-kind support eScience
	1 workshop	At least 2 workshops
	Commitment with regard to fte and sustainability	
	Any discipline	
Available	6	9

² See [nwo.nl/en/extension-clause](https://www.nwo.nl/en/extension-clause)

³ See [lorentzcenter.nl](https://www.lorentzcenter.nl)

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 **6 May 2021, 14:00:00 CET**.

Full proposal

The closing date for the submission of full proposals is **2 September 2021, 14:00:00 CET**.

2.4 Letters of commitment

Two letters of commitment are required.

1. A letter of commitment signed by the dean or director of the institution at which the LA is employed, detailing the LA's investment in the project in fte and to be submitted at the project proposition stage.
2. A letter of commitment regarding software sustainability must be submitted together with the full proposal, signed on behalf of an institute or other formal entity, e.g. research institute, research infrastructure (GWI, ERIC, etc), research school and/or faculty. The letter of commitment 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. *It is crucial to involve an institution at an early stage in the process of writing a proposal, as well as to involve that institution in the project itself.*

There is no one-size-fits-all solution for software sustainability and different possibilities and combinations are acceptable. Some examples of measures and strategies:

- the software is hosted by an institute and a user support desk is made available for a period of X years
- the software is integrated into teaching in a course on the Bachelor or Master level for Y years
- the software is integrated into a research infrastructure based on a large community
- a researcher or RSE from a research institute is allocated to the project to co-develop the software during the project (and help maintain it afterwards)
- the software is integrated into an overarching software suite used in other (research) projects
- a commercial partner is included as co-applicant on the basis of a concrete in-cash or in-kind investment

2.5 Specific conditions

Apart from the letters of commitment mentioned above, full proposals must be submitted with the following additional documents:

- a reasoned list of requirements regarding digital infrastructure
- a data management plan
- a software sustainability plan

Details are provided below.

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.

Data management plan

The policy followed by NWO applies. Responsible research data management is an essential component of good research practice. In addition to being safely stored and carefully curated, research data should be made available for reuse as widely and as early as possible. The guiding principle in this respect is ‘as open as possible, as closed as necessary.’

In case data is collected, created or processed during the project, the LA and the research team need to make clear how they will be managed and curated, so that they can be made publicly available. The data management plan can be adjusted during the project but in all cases requires the explicit consent of the eScience Center. The eScience Center requests the LA to use one of several approved *data management templates*⁴, to best match the details of the awarded project and/or any specific requirements of the LA’s research institute.

Software sustainability plan

The lead applicant needs to present a clear software sustainability plan, based on the institutional commitment agreement and using the template provided. The plan may be adjusted on submission of a signed commitment superseding the previous one, and on explicit prior approval of the eScience Center.

Furthermore, the following conditions are applicable:

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 proposal template 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.⁵ When writing the project proposal, the LA should be aware that:

- All source code will use permissive open-source licenses; research software developed by the eScience Center during the project will be licensed under the Apache 2.0 license. Software will be published in publicly accessible repositories such as GitHub from the start of the project, allowing community contributions. Software will also 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).
- Substantial effort is put into making software sustainable. Preference should be given to extending, improving and strengthening existing research software supported by existing

⁴ nwo.nl/en/research-data-management

⁵ nwo.nl/en/open-science

- research communities. Developing new software should only be proposed when no other viable alternatives exist.
- Research data and publications are freely available under open licences at the earliest possible stage.
 - 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 academic publications resulting from research awarded under this call for proposals are to be publicly accessible (in open access) at the time of publication.

General conditions

- An identical project proposal may not have been awarded elsewhere.
- Awarded projects must commence within six months after the award date.
- The proposal must match with eScience Center 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 workplan.

2.6 Submitting the application

- Applications must be completed in English.
- Use the application form (project proposition or full proposal) from the eScience Center website. The link will be available after the information event.
- 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 4.1).
- Project proposition and full proposals must be submitted no later than the deadlines set in Section 2.3.
- In 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 intent from e.g. private partners should be added to the ISAAC fact sheet in a separate PDF-file in ISAAC as an attachment to the application form.
- A proposal must be submitted to one of the discipline areas mentioned in Section 1.1: Physical Sciences and Engineering, Life Sciences, Social Sciences and Humanities. In case of doubt, please contact the eScience Center.

3 Assessment procedure

3.1 Procedure

The evaluation and selection procedure consists of three main steps. NWO will be involved to guarantee proper procedure in the full proposal phase. The procedure as a whole is intended to be as light-weight as possible.

Information event

To inform interested applicants of the specific aims of this call for proposals, as well as the role and expertise of the eScience Center RSEs, an information event will be organized on **23 March 2021 (13.00-17.00)**. In cases of force majeure the event will take place online. More information can be found on esciencecenter.nl/collaborate.

Step 1: Project proposition

The project proposition stage is intended to select those potential proposals that may proceed to step 2 (the full proposal stage). This call aims to allocate projects evenly over the three discipline areas mentioned in Section 1.1.

The LA must submit a project proposition outlining the project ambitions. The project proposition should outline the research problem and clarify the requirements to be fulfilled by the research software on which the LA would like the eScience Center RSEs to work.

The project proposition should be submitted via ISAAC in the appropriate template (esciencecenter.nl/collaborate). The closing date for the submission is **6 May 2021, 14:00:00 CET**. It is important that the lead applicant should already make certain at this stage that the specific conditions mentioned in Section 2 can be realistically met.

The project proposition will be checked for eligibility at the eScience Center based on the criteria listed in Section 3.2 (letter of commitment and match in expertise). If the number of project propositions is higher than twice the number of projects that can be awarded, the eScience Center reserves the right to make a random selection out of a pool of all eligible project propositions. Only eligible project propositions will be included in the random selection, should it take place. The outcome is binding.

Step 2: Full proposal and assessment

Full proposals must be submitted before **2 September 2021, 14:00:00 CET**. The following procedure will then be adhered to:

Eligibility check

A formal eligibility check will be performed by NWO regarding the eligibility of the LA, the correct completion of the template, the inclusion of letters of commitment, the extent to which the special conditions have been met, and the presence of information required for a check of software and data accessibility and quality (Section 2.5).

Panel assessment

An assessment panel will assess the proposals. The panel will consist of expert representatives from each of the discipline areas (Section 1.1), experts in applied computer science and experts from the eScience Center. The assessment will be based on the criteria mentioned in Section 3.2. The assessment panel will rank the proposals. Because this call aims to allocate projects evenly over the three discipline

areas mentioned in Section 1.1, proposals in different disciplines areas do not compete with each other. The ranking will then be submitted, together with a recommendation, to the Board of the Netherlands eScience Center.

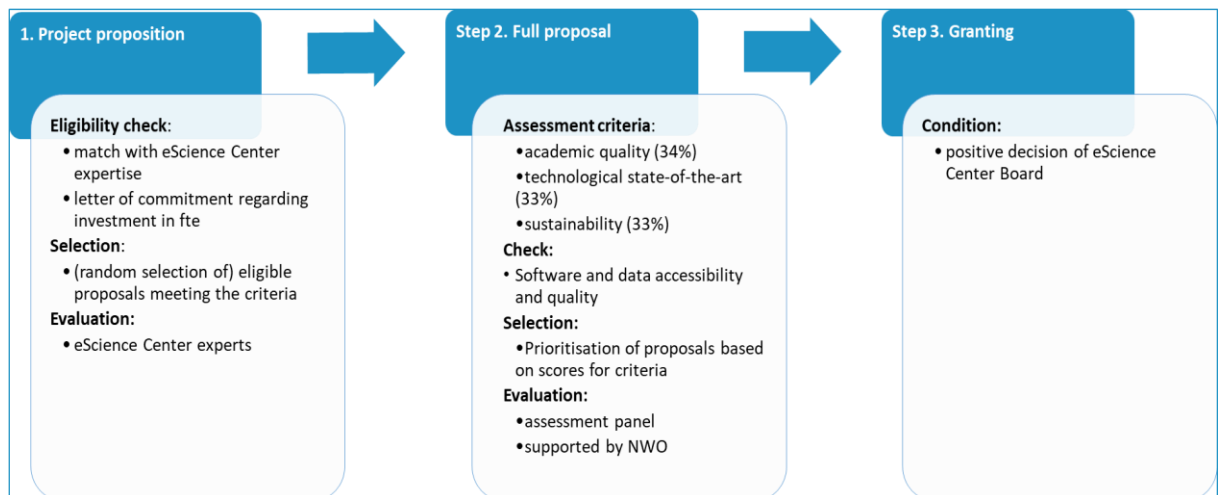
Step 3: Awarding decision

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

Timetable

23 March 2021	information event
6 May 2021, 14:00:00 CET	deadline project proposition
May 2021	eligibility check and selection
2 September 2021, 14:00:00 CET	deadline full proposal
September 2021	eligibility check
October-November 2021	panel assessment
December 2021	applicants informed of final decision

Figure 1. Overview of the Open eScience Call procedure



3.2 Assessment criteria

Criteria (project proposition)

To proceed to the random selection, proposals should

- propose a realistic match with eScience Center expertise
- include a letter of commitment signed by the dean or director of the institution at which the LA is employed, detailing the LA's personal investment in the project in fte (minimally 0.3 fte per year).

Criteria (full proposal)

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

Academic quality (34%)

- the proposed research should aim to solve a specific, urgent challenge in the selected discipline
- the proposal must indicate how the proposed research is connected with efforts within the broader research community to address the methodological issue at hand
- the LA should have demonstrable knowledge and experience in applying digital methodologies to research
- 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 plan

Technological state-of-the-art (33%)

- the proposal should discuss relevant existing technologies (if any) and methodologies and indicate why these do not suffice
- the proposal must indicate the technological and/or methodological challenges that need to be overcome
- the proposal must indicate which research outcomes the projected software solution(s) are expected to lead to

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 must be open source/open access and permit use and/or interpretation by other researchers
- 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
- the proposal must indicate which efforts are made to promote the results of the project, in terms of both academic publication and of research community (demonstrations, posters, presentations, workshops, etc)

4 Contact details

Specific questions about this call

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

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

Programme Director Netherlands eScience Center

Tel.: +31 (0)20 460 4770

Email: 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 organisations

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. KNAW-instituten

Hubrecht Instituut voor Ontwikkelingsbiologie en Stamcelonderzoek
Huygens ING
Internationaal Instituut voor Sociale Geschiedenis
Koninklijk Instituut voor Taal-, Land- en Volkenkunde
Meertens Instituut
Nederlands Herseninstituut
Nederlands Instituut voor Ecologie
Instituut voor Oorlogs-, Holocaust- en Genocidestudies
Nederlands Interdisciplinair Demografisch Instituut
Westerdijk Fungal Biodiversity Institute

3. NWO-instituten (NWO-I)

Physics of functional complex matter
Advanced Research Center for Nanolithography
Netherlands Institute for Radio Astronomy
Centrum Wiskunde & Informatica
Dutch Institute for Fundamental Energy Research
Nikhef - Nationaal instituut voor subatomaire fysica
Koninklijk Nederlands Instituut voor Onderzoek der Zee
Nederlands Studiecentrum Criminaliteit en Rechtshandhaving
Netherlands Institute for Space Research

Appendix B - eScience Center Expertise

The eScience Center has invested in the following expertise areas:

software quality

- developing workflow technologies: setting up an optimal and reproducible workflow
- 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