EPSRC
Engineering and Physical Sciences Research Council

Quick Reference

Please note that you must read the full Call document for guidance before submitting your proposal

Hubs for Mathematical Sciences in Healthcare

Call type: Invitation for proposals

Closing date: 16.00 on 25 July 2019

How to apply: Full Proposal stage followed by an interview.

Assessment Process: Full proposals will undergo postal peer review, followed by assessment at a prioritisation panel, resulting in a rank ordered list. There will then be interviews for the top 6-8 proposals.

Key Dates:

Activity	**Date**
Deadline for Full Proposals	16.00, 25 July 2019
Prioritisation Panel	December 2019
Interview Panel	11-12 February 2020
Funding decision	February – March 2020
Grant start date	April -October 2020

Additional Information:

Letters of support should be provided from the universities involved in the proposal and should be signed by the Pro-Vice Chancellor for Research, or equivalent. They should articulate what commitment, direct or in-kind, the university will be contributing and the support which will be given to the Hub Principal Investigator.

Contacts:

- Kate Reading, Healthcare Technologies: kate.reading@epsrc.ukri.org; 01793 44 4408
- Ruvimbo Gamanya, Mathematical Sciences: Ruvimbo.gamanya@epsrc.ukri.org; 01793 44 4212
- EPSRC Healthcare Technologies Theme: healthcare@epsrc.ukri.org

Hubs for Mathematical Sciences in Healthcare

Call type: Invitation for proposals

Closing date: 16.00 on 25 July 2019

Related themes: Healthcare Technologies, Mathematical sciences

Contents of this call document

Summary

EPSRC intends to commit up to £4 million to support the creation of Multidisciplinary Research Hubs, bringing together researchers working in the Mathematical Sciences with academics and other stakeholders within Healthcare Technologies, such as healthcare professionals.

The aim of this call is to strengthen research capacity at this important interface and to expand the range of interactions between mathematical scientists, healthcare professionals and industry. EPSRC is particularly interested in encouraging new connections and new collaborations that demonstrate the potential for research in mathematical sciences to inform and underpin developments in health and care. This may be through new mathematical approaches to problems in health and care or through development of mathematical approaches to address new and different problems.

Hubs supported by this call will be expected to carry out world leading, challenge led, novel research addressing significant mathematical or statistical challenges of direct relevance to Healthcare Technologies. Hubs may choose to focus around a single programme of research or carry out a number of related activities of interest to several partners. Hubs will be expected to continue to work with existing partners and collaborators but also engage new academic, industrial and/or clinical partners over the lifetime of the award.

It is expected that in the majority of cases, applications will be led by a Principal Investigator with a strong track record of research in the Mathematical Sciences. However, we will also accept applications led by Principal Investigators with appropriate expertise from other disciplines relevant to Healthcare Technologies. In all cases the Principal Investigator must have a demonstrable ability to lead and encourage effective collaboration with researchers from across mathematical sciences and other disciplines, including healthcare professionals.

It is expected that Hubs will be led by a multidisciplinary team where the Principal Investigator may be supported by a number of Co-Investigators and Project Partners. The collective expertise should cover the key areas of Mathematical Sciences and Healthcare Technologies relevant to the proposed research programme. Multi or single institutional bids are acceptable provided that the team has access to the appropriate spread of expertise.

Applications to support new Hubs from universities with existing centres are welcomed as well as new applications. These applications will be considered together; they will be treated equally and assessed using the same assessment process and criteria. Information about existing centres will not be made available to peer review by EPSRC; this includes the outcome of the mid-term review exercise.

Background

Applications should address challenges in any area of Mathematical Sciences of direct relevance to Healthcare Technologies and demonstrate the timeliness, novelty and potential impact of the research.

Research across a range of Mathematical Sciences will be considered. Proposals should have the following features:

- A novel and innovative approach to a significant mathematical and/or statistical challenge that is of direct applicability to the remit of EPSRC's Healthcare Technologies theme (https://epsrc.ukri.org/research/ourportfolio/themes/healthcaretechnologies/).

- Strenghthen research capacity at the Mathematical Sciences and healthcare interface.

- Involve significant advances in Mathematical Sciences research, that will have a potentially transformative effect in healthcare.

- Involve new and existing partnerships with multiple stakeholders including mathematical scientists, healthcare professionals and industry.

Some areas which have been highlighted by the community as potential topics that may benefit from multidisciplinary research, coordinated using a Hub based

approach, include the following: making sense of complex healthcare data, integration, analysis and interpretation of data for decision making, data visualisation tools, In silico modelling and simulation, mathematical and statistical modelling for healthcare applications and optimising process, system and resource management.

Potential hubs may also wish to consider how they complement current UKRI priorities/funded activities and emerging priorities including, but not restricted to programmes such as mental health, tackling antimicrobial resistance, or technology touching life.

Consideration of the translation pathway (e.g. into the clinic or commercial exploitation) should form an integral part of any proposed research programme.

Advice and inputs from industry and/or other users (e.g. representatives from clinical groups or healthcare professionals) should be an integral part of the management for each hub, to ensure that outcomes (e.g. mathematical approaches, models, software) address a significant healthcare challenge and maximise the potential for either commercialisation or adoption as appropriate.

Please note that the hubs funded through this call will focus on preclinical and precompetitive research, and results will be placed in the public domain. EPSRC cannot fund clinical trials, though costs associated with model validation, proof of concept and/or feasibility studies can be requested.

Pathways to impact may include costs for the development of researchers' skills and knowledge to understand and prepare for the challenges associated with the impact of research in the healthcare sector. Networking and knowledge exchange activities will also be important elements within successful hubs.

Topics of particular importance for the pathway to impact in Healthcare Technologies are highlighted as part of the Impact and Translation Toolkit: https://epsrc.ukri.org/research/ourportfolio/themes/healthcaretechnologies/strategy/toolkit/. Applicants must consider how these topics relate to their proposed programme of work and if they are relevant, describe in their proposal how they will be addressed throughout the award. Not all topics will relate to every project and researchers need not address those which do not. There is no expectation that researchers will undertake all impact activities themselves nor is there an expectation that researchers will develop extensive expertise in all the areas noted in the toolkit. However, applicants should consider what skills, knowledge and expertise are required and how these will be brought to the project through collaboration, training, consultation or other means. Understanding of the pathway to impact in health and the incorporation of appropriate and specific impact activities will form part of the assessment of proposals. EPSRC strongly encourage applicants to request resources to support these elements of the proposal as part of the Pathways to Impact section. A well considered and appropriately resourced Pathways to Impact section will be seen as a considerable strength.

Awards will be for up to four years after which the Hubs will be expected to sustain their momentum, if appropriate, through alternative sources of funding.

Proposals should align to the EPSRC Healthcare Technologies and Mathematical Sciences theme strategies. For more information about EPSRC's portfolio and strategies, see our website: https://epsrc.ukri.org/research/ourportfolio/.

Funding available

EPSRC intends to commit up to £4 million for awards of up to four years to support the creation of Multidisciplinary Research Hubs, bringing together researchers working in the Mathematical Sciences with academics and other stakeholders within Healthcare Technologies, such as healthcare professionals.

At least 10% of the total grant value must be dedicated as Partnership Resource funding.

The Partnership Resource funding could be used for some or all of the following activities:

- Working with new academic, clinical or industrial partners;
- Pump-priming activities;
- Workshops to encourage new collaborations;
- Matched funding for projects with partners outside of EPSRC's remit, or with potential end-users of the research.

This list is not intended to be exhaustive. If you have any queries please contact EPSRC using the contact details provided below.

Equality, Diversity and Inclusion

The long term strength of the UK research base depends on harnessing all the available talent and the Research Councils have together developed the ambitious UK Research and Innovation Equality, Diversity and Inclusion Action Plan https://www.ukri.org/files/legacy/skills/action-plan-edi-2016/

In line with the UK Research and Innovation Diversity Principles, EPSRC expects that equality and diversity is embedded at all levels and in all aspects of research practice. We are committed to supporting the research community in the diverse ways a research career can be built with our investments. This includes career breaks, support for people with caring responsibilities, flexible working and alternative working patterns. With this in mind, we welcome applications from academics who job share, have a part-time contract, need flexible working arrangements or those currently committed to other longer, large existing grants. Please see our Equality and Diversity webpages at https://epsrc.ukri.org/funding/equalitydiversity/ for further information.

Equipment

Equipment over £10,000 in value (inc. vat) is not available through this call. Smaller items of equipment (individually under £10,000) should be in the Directly Incurred - Other Costs heading.

For more information on equipment funding, please see: https://epsrc.ukri.org/research/facilities/equipment/

Eligibility

Please ensure sufficient time to create Je-S accounts for Investigators who do not currently have one.

For information on the eligibility of organisations and individuals to receive EPSRC funding, see the EPSRC Funding Guide: https://epsrc.ukri.org/funding/applicationprocess/fundingguide/

A list of eligible organisations to apply to EPSRC is provided at: https://www.ukri.org/funding/how-to-apply/eligibility/

How to apply

Submitting an application

You should prepare and submit your proposal using the Research Councils' Joint electronic Submission (Je-S) System (https://je-s.rcuk.ac.uk/).

When adding a new proposal, you should select:

- Council 'EPSRC'
- Document type 'Standard Proposal'
- Scheme "Standard"
- On the Project Details page you should select the 'Mathematical Sciences-Healthcare Technologies Hubs 2019' call.

Note that clicking 'submit document' on your proposal form in Je-S initially submits the proposal to your host organisation's administration, not to EPSRC. Please allow sufficient time for your organisation's submission process between submitting your proposal to them and the call closing date. EPSRC must receive your application by 16:00 on 25 July 2019.

Guidance on the types of support that may be sought and advice on the completion of the research proposal forms are given on the EPSRC website (https://epsrc.ukri.org/funding/applicationprocess/) which should be consulted when preparing all proposals.

Guidance on writing an application

Your proposal should include the following documentation: A standard application (Je-S) form, Case for Support, Justification of Resources requested , Pathways to Impact statement, Work-Plan, Project Partner Statement(s) of support and a Host Organisation Statement from each of the HEIs involved in the bid.

1. **A Standard Je-S form**

- a single form from the lead institution

2. **Case for Support (eight pages)**

- The eight-page case for support should include the following sections:
    - Two-page track record which demonstrates that the research team has the capability and capacity to address the identified research needs. For the Principle Investigator, there should be evidence for the necessary skills and competencies to drive the vision of the Hub.
    - Six-pages to address:

- Vision and Rationale for the Hub
    - Explain the overall vision and rationale for the EPSRC Hub for Mathematical Sciences in Healthcare;
    - Explain how this vision will achieve the aim of the EPSRC Hub for Mathematical Sciences in Healthcare call as described in call background;
    - Describe how the proposed EPSRC Hub for Mathematics in Healthcare complements not only other activities within the universities, but also those within the existing UK and international landscape.
- Initial Research Projects and Expected Themes
    - An overview is required for how the Hub will address the key research challenge(s) identified and how the research team will realise these challenges.
    - Scientific details should be provided describing the methodology for the initial projects and include sufficient detail to allow reviewers to assess the quality and ambition of the research.
    - A statement about how the Hub will progress the programme of research.
- National Importance
- Partnership Resource
    - At least 10% of the total grant value must be dedicated as Partnership Resource funding.
    - An overview of what the partnership resource funding will be used for, including immediate and future plans.
- Management
    - An explanation of how the Hub will be managed with details of the structure.
    - Successful hubs will be expected to have in place an advisory structure which can provide independent advice on the strategic development of the Hub.

3. Justification of Resources (maximum two pages)

- This should be a two page narrative description of the need for the resources requested, including how the partnership resource funding will be used. See the webpage on how to write a justification of resources for more information.

4. Pathways to Impact Statement (maximum two pages)

- Up to two pages explaining what will be done to ensure the potential beneficiaries have the opportunity to benefit. More details on what should be included in this document, and what resources could be sought, can be found on both the UK Research and Innovation, the EPSRC Pathways to Impact webpages and the webpage for the Impact and Translation Toolkit. Applicants should demonstrate a clear plan for engaging partners, including clinicians, in the research. Plans for on-going engagement should be discussed. Details should be provided about any planned new collaborations and how these partners will be engaged in the project.

5. Work plan (maximum one page)

- A full detailed four-year plan is not required as it is accepted that a detailed research plan for the latter years is not known and will depend upon research results from not only the Hub, but from other research groups nationally and internationally. It is expected however, that sufficient detail for the initial two years is given in order for reviewers to have confidence that there is a structured approach. An indication of milestones and decision points for the final two years should be outlined to demonstrate the shaping of the research programme.

6. Letters of Support from host organisations

- Letters are required from the universities involved in the bid and should be signed by the Pro-Vice Chancellor for Research, or equivalent. They should articulate:
    - How the Hub will align with the University's research strategy;
    - What commitment, direct or in-kind, the university will be contributing;
    - What support will be given to the Hub Principal Investigator
    - The letters should be uploaded to Je-S as "Letters of Support".

7. Other Attachments:

- The only other standard attachments allowed are as follows. Any other attachments submitted will not be shown to the panel.
- **Project Partner Letters of Support:** Letters of support are required from all project partners (this includes industry, clinical and other stakeholders) involved in the bid and listed on the Je-S form.
- They should:
    - Confirm their rationale for support for the Hub, and detail their involvement with the (relevant) institution(s) to date;
    - Outline their involvement during the 4-year lifetime of the Hub;
    - Confirm their contributions of cash and in-kind support;
    - Indicate any willingness to increase this amount during the lifetime of the grant.

- Letters must be dated within two months of the proposal submission date.
- N.B. Letters of Support from organisations or individuals who are not Project Partners or host organisations should **not** be submitted.
- **CVs:** CVs are only allowed for named research staff (those supported under Directly Incurred costs).

Ethical Information and Je-S completion guidance

Applicants should use the Ethical Information section on the Je-S form to demonstrate to peer reviewers that they have fully considered any ethical issues concerning the material they intend to use, the nature and choice, current public perceptions and attitudes towards the subject matter or research area. EPSRC will not fund a project if it believes that there are ethical concerns that have been overlooked or not appropriately accounted for. All relevant parts of the Ethical Information section must be completed. If the research will involve human participation or the use of animals covered by the Animals (Scientific Procedures) Act 1986 it is recommended that applicants pay particular attention to the guidance highlighted below. EPSRC reserves the right to reject applications prior to peer review if the Ethical Information sections are not completed correctly.

Further guidance on completing the Je-S form can be found at https://je-s.rcuk.ac.uk/Handbook/pages/GuidanceonCompletingaStandardG/EthicalInformation.htm. Other relevant guidance includes: EPSRC's policy on animal use in research (https://www.epsrc.ukri.org/about/standards/animalresearchpolicy/) and the Responsible Innovation Framework (https://epsrc.ukri.org/research/framework/).

Please note that on submission to EPSRC **all** non-PDF documents uploaded onto Je-S are converted to PDF, the use of non-standard fonts may result in errors or font conversion, which could affect the overall length of the document.

For advice on writing proposals see:
https://epsrc.ukri.org/funding/howtoapply/preparing/

User Engagement Strategy

Successful applicants will be required to develop and execute a strategy for engaging with potential users of the research funded in the project (resources for this activity can be requested as part of the Pathways to Impact and must be justified in the application). This strategy should be reviewed and updated regularly as part of the formal management of the grant.

The strategy should cover:

- how and when potential users have been / will be identified;
- what form the engagement will take;
- what steps will be taken to ensure that outputs of the research are made available to potential users;
- suitable metrics for determining the success of the strategy in delivering value to users.

Assessment

Assessment process

A three-stage assessment process will be used.

Stage 1: Postal Peer Review

Full proposals will be sent to independent peer reviewers, including at least one nominated by the applicant. The expert peer reviewers' role will primarily be to comment on the quality of the proposed research. Those with sufficiently favourable reviewers' comments will be invited to respond to these comments and will be assessed at a prioritisation panel.

Stage 2: Prioritisation Panel:

A panel will be asked to rank proposals in a priority order in order to select the proposals which will be invited to interview.

Stage 3: Interview Panel

An interview stage will be held in order to select the final successful proposals. Full details of the interview process will be sent to candidates prior to the interviews.

There will not be formal presentations by the applicant as part of the interview. The Principal Investigator and up to two others identified on the proposal will be invited to attend the interview and it is expected that at least one of the attendees will be a user (for example, from industry or clinic).

Assessment criteria

The assessment criteria at the **full proposal stage** are given below:

Quality (Primary)

- Excellence of the research base; does the proposed Hub address a significant mathematical challenge of direct applicability to healthcare provision that could not easily be addressed by standard mode research grants? Is it ambitious, novel and adventurous? Is the proposed methodology appropriate? Is this a novel and innovative approach to a significant mathematical and/or statistical challenge that will have an impact in healthcare?

National Importance (Secondary Major)

- How the research will contribute to, or help maintain the strength of other research disciplines, contribute to addressing key UK societal challenges, contribute to current or future UK economic success and/or enable future development of key emerging industry(s)

- How the research will meet national strategic needs by establishing or maintaining a unique world leading research activity in mathematical sciences and healthcare.

- Applicants should also comment on how the research contributes to:

- Healthcare Technologies Strategy https://epsrc.ukri.org/research/ourportfolio/themes/healthcaretechnologies/strategy/

- Mathematical Sciences Strategy: https://epsrc.ukri.org/research/ourportfolio/themes/mathematics/strategy/

- The wider EPSRC's research areas and strategies https://epsrc.ukri.org/research/ourportfolio/researchareas/

- Fits with and complements other UK research already funded in the area or related areas, including the relationship to the EPSRC portfolio and our stated strategy set out in https://epsrc.ukri.org/research/ourportfolio/.

Overall vision (Secondary)

- Including strategy for the Hub, plans for longer term. Will the Hub substantially strengthen UK research at the Mathematical Sciences-Healthcare Technologies interface? How will the Hub complement and differ from past and existing activities? How will the Hub strenghthen research capacity at the Mathematical Sciences and Healthcare interface.

Impact (Secondary)

How convincing is the strategy for developing viable pathways towards impact and translation? How complete and realistic are the impacts identified for this work? What is the effectiveness of the activities identified to help realise these impacts, including the resources requested for this purpose? Are the beneficiaries or collaborators relevant and appropriate?

Applicant team (Secondary)

- Is there advocacy and vision with potential to influence beyond the immediate research team? Are there strong clinical partnerships to help inform and shape research questions? Is the track record and balance of skills of the applicant(s) appropriate?

Resources and Management

Is the proposed management plan convincing? Is there career planning and development for researchers? Are the resources requested fully justified? If the hub will need access to equipment, are arrangements for this viable? Is there appropriate University commitment? Is there attention to developing career pathways at this interface?

At the interview stage, there will be particular focus on:

- **Leadership and applicant team;** does the Principal Investigator have a strong track record of research in a relevant discipline? Is the Principal Investigator well placed to lead the management of the Hub? Is there potential for leadership and advocacy to engage both healthcare and mathematical sciences communities?

- **Impact and Plans for partnership development** and use of partnership resource funding; How will the hub develop strong cross-sectoral partnerships to help inform and shape research questions? Are

there appropriate plans to disseminate results, exchange and sustain knowledge and build collaborations with industrial and/or clinical users of the research? Exploitation strategy and potential impact, including networking and outreach to other research and user groups; are the potential beneficiaries of the Hub's outputs clearly identified? How will they benefit?

Feedback:

The majority of the feedback will be considered to be the reviewer comments shared with applicants prior to the interview panels. If there is specific feedback from the interview panel, this will be provided.

Guidance for reviewers

Information about the EPSRC peer review process and guidance for reviewers can be found at: https://epsrc.ukri.org/funding/assessmentprocess/review/

Guidance for reviewing standard grants can be found here:

https://epsrc.ukri.org/funding/assessmentprocess/review/formsandguidancenotes/standardgrants/

Additional grant conditions (AGCs)

Grants will be subject to the standard UK Research and Innovation grant conditions however the following additional grant conditions will be added to this call:

- The need for EPSRC to agree the management structure, including terms of reference and membership, and to be invited to meetings of the advisory body;
- The need for a collaborative agreement between institutions, and with any Project Partners, to be in place before the project begins;
- The abidance of publicity/branding guidelines; the name of the EPSRC Hub shall be "EPSRC Hub for XXXXX";
- That 10% of the total value of the grant is dedicated partnership resource funding and must be used as such.

Moving forward

Submissions to this call will count towards the Repeatedly Unsuccessful Applicants Policy. Further information about the policy can be found at: https://epsrc.ukri.org/funding/howtoapply/basics/resubpol/rua/

Key dates

Activity	**Date**
Deadline for Full Proposals	16.00, 25 July 2019

Prioritisation Panel	December 2019
Interview Panel	February 2020
Funding decisions announced	February – March 2020
Grant start date	April -October 2020

*EPSRC aims to adhere to the key dates as published, however there may be exceptions where the sift, prioritisation or interview meeting may have to change due to panel member availability.

Contacts

- Kate Reading, Healthcare Technologies: kate.reading@epsrc.ukri.org; 01793 44 4408
- Ruvimbo Gamanya, Mathematical Sciences: Ruvimbo.gamanya@epsrc.ukri.org; 01793 44 4212
- EPSRC Healthcare Technologies theme: healthcare@epsrc.ukri.org

Change log

Name	Date	Version	Change
Kate Reading	24/4/2019	1	

Je-S attachments Check List

Attachment Type	Maximum Page length	Mandatory/Optional	Extra Guidance
Case for Support	Eight pages	M	Comprising up to two A4 sides for a track record, and six A4 sides describing proposed research and its context.
Pathways to Impact	Two pages	M	
Workplan	One Page	M	
Justification for Resources	Two pages	M	

CVs	Two pages each	As Required by EPSRC	For named and visiting researchers, and researcher co-investigators only.
Project Partner Letters of Support	No page limits	As Required by EPSRC	Must be included from all named project partners. Must be on headed paper, and be signed and dated within six months of the proposal submission date.
Letters of Support	No page limits	As Required by EPSRC	University commitment and support
Technical assessment	No page limit	As required by EPSRC	Only applicable if facility use
Proposal Cover Letter	No page limit	Optional	The cover letter can be used to highlight any important information to EPSRC. This attachment type is not seen by reviewers or panel members.
Other attachment	No page limit	As required, at EPSRC request only	This can be used for a document that does not fit under any of the headings above. This attachment type is not seen by reviewers or panel members.

Please ensure you adhere to the above attachment requirements when submitting your proposal. Any missing, over length or unnecessary attachments may result in your proposal being rejected.