

JAPAN-UK
JOINT CALL FOR PROPOSALS ON
“Engineering Biology”

This joint call is launched jointly by the Japan Science and Technology Agency (JST) and Biotechnology and Biological Sciences Research Council (BBSRC), part of United Kingdom Research and Innovation (UKRI). Proposals submitted to JST and BBSRC will be evaluated jointly and adopted projects will be jointly supported by both agencies. Japan based research teams will be supported by JST; UK based research teams will be supported by BBSRC.

Opening date:

15 January 2024

Closing date:

16 April 2024 (18:00 JST/16:00 GMT)

1. Introduction

JST and UKRI/BBSRC are working together to foster cooperative efforts in scientific research between Japan and the UK and is launching a joint call as part of this initiative. The call for proposals is for internationally collaborative research projects in Engineering Biology, an emerging priority area to both Japan and the UK.

At Japan side, the adopted project will be supported by JST’s program, the ASPIRE (Adopting Sustainable Partnerships for Innovative Research Ecosystem). ASPIRE is an initiative to develop and strengthen international joint research in scientific and technological fields of strategic priority with like-minded countries. Through this program in cooperation with partner national and regional funding agencies from these countries, JST aims to support international joint research and foster early career researchers who may be the future leaders in their fields by connecting top researchers and promoting international talent mobility.

At UK side, this partnership program will be supported via the International Science Partnership Fund (ISPF), designed to enable close working with international partners to address global challenges, build knowledge and

develop the technologies of tomorrow. It puts research and innovation at the heart of international relationships, supporting UK researchers and innovators to work with peers around the world on the major themes of our time, developing new connections and strengthening their international networks. It's managed by the Department for Science, Innovation and Technology and is delivered by a consortium of the UK's leading research and innovation bodies.

For more information visit the:

UKRI ISPF webpage [International Science Partnerships Fund – UKRI](#)

UK Government webpage:

<https://www.gov.uk/government/publications/international-science-partnerships-fund-ispf/international-science-partnerships-fund-ispf>

The submitted proposals will be evaluated by both countries' experts along with the criteria to achieve both programs' purposes described above.

2. Aim of Joint Call and Scope

Aim

Based on the implementation principles of the ASPIRE program in Japan and the ISPF in the UK, this partnership program, aims to support internationally competitive collaborative research projects between Japan and the UK focusing on the fundamentals of engineering biology and cross-cutting technologies, creating leading international researcher networks, and nurturing early career researchers to drive tomorrow's engineering biology.

Call Scope

Engineering biology is the process of taking synthetic biology concepts and translating them into real-world solutions, for example:

- the design and fabrication of biological components and systems
- using engineering technologies and principles
- from modifications to natural systems through to artificial biology.

Consequently, engineering biology encompasses the entire innovation ecosystem, from breakthrough synthetic biology research to translation and

application.

Engineering biology has the potential to offer solutions to a range of global societal challenges. This opportunity will create a pipeline for the development of high-risk, high-reward ideas and will exploit engineering biology approaches to generate impact across a range of sectors.

This funding opportunity aims to support research under the following research topics.

- I. Discovery- inspired projects:** Under this topic, we are looking for novel and high-risk ideas primarily focused on the design and re-design of biological cells, organisms and systems (synthetic biology). Research themes include bioengineered cells & systems (including synthetic plants), bio-inspired design and novel materials. Further details of these three themes can be found below. These descriptions are not exhaustive, and all ideas that fit under these themes are encouraged. We also recognize that these themes do not have hard boundaries, therefore novel ideas that cut across the three themes are also encouraged.

The bioengineered cells and systems

The bioengineered cells and systems theme aims to develop novel approaches and technologies that allow us to construct 'de novo' or modify existing cell and biological systems efficiently and effectively. We anticipate that engineering biology will be applied to:

- innovation in precision genome engineering technologies
- meet challenges at different biological scales (for example synthetic organelles, functionally-modified cells, hybrid networks such as brain-computer interfaces)
- further the development and control of minimal/protocells, synthetic microbial communities and artificial life.

The bio-inspired design theme

The bio-inspired design theme aims to build on the fundamental potential

of biology. In this theme we anticipate that engineering biology will be exploited to utilize and enhance the properties of nature for biotechnological solutions, such as the sensitivity of receptors in a dog's nose and broader sentinel organisms, navigation due to magnetoreception in a bird's brain, or the data storage and computing capability of nucleic acids and cells.

The novel materials theme

The novel materials theme aims to develop new materials, products and production processes. It is anticipated that engineering biology can be used to create more sustainable production processes or alternative production solutions, and develop new:

- materials
- non-natural materials
- integrated materials
- smart/functional materials.

II. Cross-cutting research & technologies: Under this topic, projects would be in transformative areas underpinning research and technology development to unlock the full impact and benefit the engineering biology field as a whole. This would include but not be limited to areas of e.g., rational design, sensors, scalability, metrology and standardization. The development of computational approaches, Artificial Intelligence, Machine Learning that can revolutionize the design of engineering biology experiments would also be in scope even if no 'wetlab' engineering biology is conducted.

Note: Applicants should carefully consider the information provided in the Appendix 1 for the scope of this joint call.

3. Indicative Timetable

Publication of the call for proposals	15 January 2024
Application deadline	16 April 2024 (18:00 JST/16:00 GMT)

Document review	April to June 2024
Assessment panel meeting	July 2024
Interviews for Japan based PIs who pass the document review*	August 2024
Notification of results	late September 2024
Start of research	December 2024

Note: the above details (except the application deadline) are subject to change.

*Applicants will be notified by email at least two weeks before the interview date.

4. Support Scale

The funding amount from JST to the Japanese applicants will be up to 180 million Japanese Yen per project (up to 234 million Japanese Yen including 30% overhead expenses), lasting from the start of the project to the end of March 2028. This may be extended to the end of March 2030 subject to travelling and other research exchanges.

The funding amount from BBSRC to the UK applicants will be up to 1 million British Pounds per project at 80% of its full economic cost for a maximum project duration of 36 months.

A maximum of five projects will be funded from this call for proposals.

5. Eligible beneficiaries and composition of the consortia

I. Eligibility

- Requirements for Japan-side research team: Researchers or research teams that are conducting research at a research institution (university, independent administrative institution, public experimental research institution, public-interest corporation, or company) within Japan are eligible to apply. Researchers and research institutions applying must register with the “Cross-Ministerial Research and Development Management System (e-Rad)” prior to application.
<https://www.e-rad.go.jp/index.html>
- Requirements for UK-side research team: Applicants in the UK must

meet the standard UKRI and BBSRC eligibility requirements. Eligible institutions include UK-based Research Organizations (ROs), Research Council Institutes (RCIs) and approved Independent Research Organizations (IROs), Public Sector Research Establishments (PSREs). More detail about UK eligible researchers and institutions can be found here: <https://www.ukri.org/councils/bbsrc/guidance-for-applicants/check-if-youre-eligible-for-funding/>

Applicants in the UK must meet the [BBSRC eligibility requirements](#).

UKRI are committed to achieving equality of opportunity for all funding applicants. Applications from a diverse range of researchers is encouraged and there is support for people to work in a way that suits their personal circumstances. This includes:

- career breaks
- support for people with caring responsibilities
- flexible working
- alternative working patterns

Find out more about [equality, diversity and inclusion at UKRI](#).

II. Consortium composition

Each project proposal must have at least two eligible research teams: one team (at least) in Japan and one team (at least) in the UK.

Each team in Japan and the UK should consist of the below members, led by a Principal Investigator (PI)/Project Lead (PL). Each team should also include one or several researchers who will travel from Japan to UK and from UK to Japan respectively to conduct research (outgoing researcher).

Japanese team should include assigned roles from the following list:

- Principal Investigator (PI)
The PI is a researcher who will be directly supported by JST and is the representative of the research team in Japan. They are responsible for directing and overseeing the whole project. The PI must be affiliated with a research institution in Japan.

- Co-Principal Investigator (Co-PI) (if needed)
The Co-PI is a researcher who will be directly supported by JST and collaborates with the PI in conducting the research project. The Co-PI must be affiliated with a research institution in Japan.
- Research participants
Research participants are researchers, technicians, research assistants, students and others who are part of the research project under the direction of the PI or Co-PIs but are not directly supported by JST.
- Outgoing researcher(s)
In principle, the researcher(s) going abroad should fall under either (i) or (ii) to be eligible. The outgoing researcher(s) will conduct research activities in the UK for about one year. There is no limit to the number of researchers who may go abroad, and they can be the PI, Co-PI or research participants of the project.
 - (i) Students enrolled in an advanced degree course (i.e., master's or doctoral course) *
 - (ii) Researchers who have obtained their final degree less than 15 years ago and are conducting research activities at universities, public research institutions, etc.

*Students who are enrolled in a master's course, doctoral course or transitioned to a postdoctoral researcher position upon completion of their doctoral course are required to obtain prior approval from the project PI or Co-PI and the research institution to which they belong to in order to use ASPIRE funds.

UK team should include assigned roles from the following list:

- project lead (PL)
- project co-lead (UK) (PcL)
- researcher co-lead (RcL)
- specialist
- technician
- visiting researcher
- research and innovation associate

- professional enabling staff

Only one individual should be listed as project lead. Outgoing researcher(s) from UK to Japan could include any of the above-mentioned categories. Please note that Doctoral Students can be employed to carry out specific activities on project. In these cases, you should select **another role type** from the above list which aligns to their work on the project. There is no limit to the number of outgoing researchers and the outgoing researcher can also be the PL of the project. For further detail on [UKRI's grant roles, eligibility responsibilities and costings please refer to the following guidance: Roles in funding applications: eligibility, responsibilities and costings guidance – UKRI.](#)

6. Proposal Submission

The Japan and the UK team will need to submit their applications by parallel submission, using the designated application form (Japan-UK Engineering Biology_form.docx) to draft a joint proposal and submit it to the application websites of their respective countries. Each research team in each country shall be led by a PI/PL who is also responsible for submitting the required consortium application documents on behalf of the consortium, to JST /BBSRC. The PI/PL in Japan and the UK should ensure that there are no differences in the content of the proposals submitted in the designated application form to Japan and UK.

Project proposals are to be submitted through the following websites:

- For the PI's from the Japan side: [Cross-Ministerial Research and Development Management System \(e-Rad\)](#)

Call Title (Japanese):

2024 年度 日英共同公募「エンジニアリングバイオロジー」

Call Title (English):

Japan-UK engineering biology for discovery research and cross-cutting technologies

- For the PL's from the UK side: [Sign in - UKRI Funding Service](#)

The applicants are to follow the proposal structure provided in the application form.

Note for Japanese Applicants

- I. Please follow [Application Guidelines 「公募要領別紙」](#) in addition to this call text before applying. The Japan based PI must have completed the designated online research ethics course prior to application. (See Section 4.1 in 「公募要領別紙」 for more info).
- II. Multiple applications to JST ASPIRE 2024 Call for Proposals and the Japan Agency for Medical Research and Development (AMED) ASPIRE 2024 Call for Proposals will not be accepted.
- III. As ASPIRE aims to promote international networking and fostering early career researchers, applicants to this call may apply to other research grant programs with content that overlaps with their ASPIRE research project.

Note for UK Applicants

Please note that additional information further to the joint application form will be requested via UKRI's Funding Service. Additional questions will include request for a detailed UK budget breakdown and Ethical Considerations on [Use of Animals in Research](#), [Managing Risks of Research Misuse](#) and [Trusted Research](#). Please ensure you fill out the requested information on UKRI's Funding Service in parallel with completing the joint application form.

7. Assessment

Project proposals received by JST and BBSRC will be subject to an assessment process if they meet the requirements of both agencies and are within the scope of this opportunity.

Assessment Process

Each project proposal will be peer reviewed by invited reviewers who are experts in the particular fields represented by the proposal, against the criteria specified for this funding opportunity.

The evaluation criteria are as follows:

Criteria	Description of the criteria
i. Relevance and quality of the	• Are the proposed research activities of an excellent quality and importance within or beyond the fields or

<p>research content and plan</p>	<p>areas concerned?</p> <ul style="list-style-type: none"> • Has the potential to advance current understanding, generates new knowledge, thinking or discovery within or beyond the field or area? • Is timely given current trends, context and needs? <ul style="list-style-type: none"> - is relevant to the scope of the scheme including at least one of the research themes. • Will impact world-leading research, society, the economy and/or the environment. • Has the viability to create a leading international researcher network of the research community in the relevant research area?
<p>ii. Have the applicants demonstrated that they have designed their approach so that it</p>	<ul style="list-style-type: none"> • Is effective and appropriate to achieve their objectives. • Is feasible, and comprehensively identifies any risks to delivery and how they will be managed. • If applicable, uses a clear and transparent methodology. <ul style="list-style-type: none"> - The tools, methods and technologies applied should be the most appropriate for the delivery of the objectives according to the cutting-edge of the field, or fields, under investigation. • If applicable, summarizes the previous work and describes how this will be built upon and progressed. • Will maximize translation of outputs into outcomes and impacts
<p>iii. Clear rationale for the Japan-UK partnership and the added-value this offers to advance the research field. Concreteness and feasibility of the plan to create a leading</p>	<ul style="list-style-type: none"> • Explaining the research strengths, the unique added value opportunities, complementary expertise or synergy in research efforts that bringing together the UK and Japanese teams, provides to advance the research. • Describing an appropriate balance of opportunities for the exchange of people (for example. researchers and technicians), including the purpose of the exchanges and their potential to enhance the professional development of those involved. • Has an appropriate, concrete, and feasible plan for

international researcher network.	how the UK and Japanese teams and their research environments will realize the creation of a world-class international researcher network in the relevant research community
iv. Concreteness and feasibility of plans for promoting early career researchers and researcher mobility	<ul style="list-style-type: none"> • Are appropriate goals set for fostering early career researchers through international mobility activities? • Are there plans to involve a sufficient number of early career researchers? • Is an effective developing plan for the early career researchers considered and is the plan suitable for fostering the next generation of top researchers? • Are the roles and length of stay for the outgoing researcher(s) clearly described and appropriate? Is the exchange plan feasible?
v. Relevance and diversity of the research team. Qualification of the PIs/PLs and the team of the research project in Japan and the UK	<ul style="list-style-type: none"> • Does the research team have a well-balanced composition of experience, given the objectives of the proposal? • Does the PI/PL have sufficient ability to manage the research? • Does the PI/PL have sufficient research achievements to have potential to join the international top research community, or can be deemed to already be a part of it as shown by high level research achievements? • Does the PI/PL have demonstrated the ability to support early career researchers and international talent mobility? • Do the PI/PL and team have sufficient qualifications to carry out the research activities in accordance with the proposal and purpose of this call?
vi. Have the applicants demonstrated how the resources they anticipate needing for their	<ul style="list-style-type: none"> • Are comprehensive, appropriate, and justified, is the budget for fostering early career researchers through international mobility activities sufficient and is the budget plan appropriate? • Represent the optimal use of resources to achieve the intended outcomes. • Maximize potential outcomes and impacts

The reviewers will provide evaluation comments and scores for each project proposal, and all the proposals will be subject to an assessment panel to make a funding recommendation. If necessary, the PIs/PLs will be asked to respond to reviewer comments to provide additional information for the assessment panel.

The assessment panel will be comprised of experts from Japan and the UK jointly appointed by JST and BBSRC. The panel will assess the project proposals and collaboratively generate a ranked list of recommendations that will be provided to both funding agencies.

JST will conduct interviews with the Japan based PIs of the recommended projects to verify that it is eligible for funding and align with the objectives of ASPIRE if selected.

8. Project Implementation and Reporting

I. Expenditure/costs eligible for funding

Japanese team :

(1) Direct Costs

Direct costs encompass expenditures that are directly essential for the completion of research, as outlined below:

a. Travel Expenses

Travel and accommodation expenses for researchers going abroad and for research participants described in the research plan.

b. Personnel Costs

Personnel expenses for research participants described in the research plan (PI and Co-PI personnel expenses and teaching buyout policy may apply). Personnel expenses for administrative staff necessary to coordinate the researchers' travel and their personnel-related procedures.

c. Facilities, Equipment and Consumables

Purchasing research equipment, books, reagents, materials and consumables, etc. Research expenses of researchers abroad.

d. Miscellaneous

Necessary costs for the research and development (cost for organizing and hosting events for research dissemination, equipment leasing costs, transportation costs for equipment used for the research project).

(2) Indirect Costs

Indirect costs refer to funds which go directly to the research institution for administrative overhead costs.

(3) Points of Caution

Participants are to allocate around 70% of the total direct cost to activities that further ASPIRE's objectives of (1) building and expanding international research networks that foster cutting-edge research and development (2) laying the foundation for long-lasting relationships and continued involvement in the international research community by promoting international talent mobility and providing research opportunities to early career researchers.

The above-mentioned research expenses reserved for promoting international networking and fostering future generations of researchers may cover the following expenses related but not limited to:

- holding workshops to develop and strengthen relationships among researchers
- travel expenses for the researchers going abroad to the partner country and the expenses incurred during the stay
- personnel expenses for administrative staff that coordinate the travel of outgoing researchers and their personnel-related procedures.

Please note that employment, procurement of equipment, etc. purely for the purpose of conducting research does not count as a part of the 70%.

UK team :

BBSRC's standard costing guidelines would apply to this partnership program. Please refer to this guidance:

<https://www.ukri.org/councils/bbsrc/guidance-for-applicants/costs-we-fund/>

For more information on Directly Incurred costs, covering Staff time, Travel and subsistence, Equipment and Other Costs please refer to this link: <https://www.ukri.org/councils/bbsrc/guidance-for-applicants/costs-we-fund/directly-incurred-costs/>

For more detail around Directly Allocated and Indirect costs, please refer to this link: <https://www.ukri.org/councils/bbsrc/guidance-for-applicants/costs-we-fund/directly-allocated-costs/>

II. Reporting

Projects will be monitored through their respective standard JST and BBSRC annual reporting processes. In addition to the funding agencies' requirements, the consortia will be requested to submit a joint final report from both PIs/PLs in each country to the appropriate agencies after the end of the research period for the joint research.

9. Contacts

(1) JST contacts

Department of International Affairs

E-mail : aspire-uk@jst.go.jp

(2) BBSRC contacts

E-mail : ISPF-BBSRC@bbsrc.ukri.org

Appendix 1: Call Scope – Further Information for Applicants

What we will fund

The following are **specific examples of inclusions (illustrative not exhaustive)**:

- orthogonal biosystems: we encourage proposals in engineering cells and organisms to include systems or parts not found in nature to impart new capacities or chemistry
- regulatory circuits: proposals for designing and inserting well-characterised circuits or networks, to generate new functions or responses in cells and organisms, are encouraged
- protocells: we also encourage proposals in bottom-up chemical design approaches to produce synthetic or semi-synthetic cells and compartments
- metabolic engineering: proposals involving using complex modifications informed by predictive models of biosynthetic pathways to allow or enhance production of useful products are also encouraged
- minimal genomes: we encourage proposals involving the understanding of the minimal number of parts (genes) needed for life, to serve as a chassis for engineering minimal cell factories for new functions
- bio nanoscience: proposals for projects that utilise and exploit synthetic molecular nano machines based on cellular systems are also encouraged

What we will not fund

The following are specific examples of exclusions:

- applications that focus on the engineering of a system in which biology is embedded, rather than engineering the biological system itself, for example:

- engineering the scaffold in tissue engineering, while not engineering the biological component
- applications that are learning from biology, rather than engineering the biological system, for example:
 - design of a purely physical or chemical mechanical construct, taking inspiration from biological systems, rather than engineering an artificial or modified biological system applications focused on the development of an output of engineering biology, with no tangible engineering biology occurring in the project, for example:
 - an experiment using a metabolite of a well-established engineered chassis as an input to a chemical process, with no demonstrable element of engineering biology conducted by the applicants
- applications where engineering biology is only a small component of the overall workplan

In counter point projects would be considered in scope if they are taking pre-existing engineering biology in a new context, for example, novel chemical production for the first time using this chassis.

Further examples of inclusions and exclusions by theme:

Bio-inspired design will:

- **exclude** applications that are learning from biology, for example, design of a purely physical or chemical mechanical construct, taking inspiration from biological systems
- **include** applications focused on engineering an artificial or modified biological system, designed and built upon knowledge learned from observations in biology, for example an organism designed to have more sensitive receptors, taking inspiration from a dog's nose

Bioengineered cells and systems will:

- **exclude** a **microbiome engineering** project, where the focus is on simply combining organisms from nature in non-natural combinations to explore form and function
- **include** a **microbiome engineering** project, where the focus is on using synthetic biology to modify some property of the organism/organisms that are involved in a microbiome project
- **exclude** a **tissue engineering** project focused on modifying the form or function of a non-biological scaffold to accommodate or improve biological form or function
- **include** a **tissue engineering** project focused on modifying the form or function of the biological components (cells, growth factors and so on) to better interact within a scaffold

【Documents Change History】

Japan-UK Engineering Biology Call Text Change History

Document name	Date	Change Details
Appendix 1	2 February 2024	<ul style="list-style-type: none">• Bio-inspired design: 'Include' and 'exclude' were transposed.• Bioengineered cells and systems: 'include' and 'exclude' were transposed in the first two bullets (on microbiome engineering project).