JAPAN-UK
JOINT OPPORTUNITY IN
“Semiconductor”

This joint call is launched jointly by the Japan Science and Technology Agency (JST) and Engineering and Physical Sciences Research Council (EPSRC), part of United Kingdom Research and Innovation (UKRI). Proposals submitted to JST and EPSRC 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 EPSRC.

Opening date:
24 May 2024
Closing date:
18 July 2024 (12:00 JST/16:00 BST)

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1. Introduction and aim

JST and UKRI/EPSRC 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 semiconductor, an emerging priority area to both Japan and the UK.

At Japan side, the adopted project will be supported by JST’s program, the ALCA-Next (Advanced Technologies for Carbon Neutrality). This Program aims to create game-changing technologies that will significantly shift the scientific and technological paradigm toward realizing carbon neutrality, based on unconventional ideas of individual researchers. It intends to uncover a wide range of research on important technologies that are attracting worldwide attention and are expected to develop into challenging yet innovative technology seeds, and aims to improve Technology Readiness Level (TRL).

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. ISPF is managed by the Department of Science, Innovation and Technology (DSIT), and delivered by a consortium of the UK's leading research and innovation bodies, including UKRI. The £337m fund supports collaboration between UK researchers and innovators and their peers around the world on the major themes of our time: planet, health, tech, and talent.

For more information (Japan side) visit the:
ALCA-Next webpage:
https://www.jst.go.jp/alca/en/index.html
JST's International Strategy:
https://www.jst.go.jp/EN/about/strategy.html
Please be sure to refer to 'Call text appendix'（「募集要項別紙」）

For more information (UK side) 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. Scope

This funding opportunity aims to support semiconductor research. Research projects should address one or more of the following priority areas of joint interest for both Japan and the UK:

1. Low power hardware for AI systems, including:
    - Low power design technologies and methods
    - Innovative architectures for improving energy efficiency
    - Hardware/software systems approach to low power devices
    - Search and/or generation of algorithm and/or architecture design

space for energy efficiency
   - 3D/2.5D IC processes, circuits, and architectures for emerging materials and new computing paradigms
   - Compatibility of AI algorithms with semiconductor hardware
   - Photonics to address any of these points above (i.e. low power / low heat / more energy efficient parallel processing etc.)
2. Power Devices / RF Devices / Electronics, including:
   - Materials, SiC-related material processes, evaluation and calculation
   - Compound semiconductors more broadly (including GaN, Ga2O3, GaAs, InP, AlN, BN etc.)
   - Applications in power electronics, radio transmission, materials for photonics
   - Active electronics and/or thermal management (e.g. diamond)
3. Security by Design, including:
   - Trusted Electronics
   - Security architectures at the design stage so that they are intrinsically part of integrated circuits
   - Discrete designs to enable security as part of a package or board
   - Approaches for secured by design System on Chip (SoC) (e.g. Capability architectures e.g. Morello, across SoC)
   - A focus on hardware and manufacture
4. Semiconductor Photonics, including:
   - Exploring materials for heterogenous integration, for example as a route to low power electronics (e.g. photonics, silicon, compound semiconductors, nanoelectromechanical systems (NEMS), microelectromechanical systems (MEMS) etc.)
   - Materials platforms for photonic integrated circuits (e.g. silicon photonics, compound semiconductors, emerging materials platforms etc.)
   - Photonic logic
   - Photonic integrated circuits (PICs)
   - Photonic communication across chip and inter-chip (inter package)
   - Novel devices (e.g. low power modulators, to efficient coupling to/from PICs, to specific reconfigurable devices for AI etc.)

3. Indicative Timetable

Publication of the call for proposals	24 May 2024
Prior notice deadline	18 June 2024
Application deadline	18 July 2024 (12:00 JST/16:00 BST)
Document review	August 2024
Assessment panel meeting	September 2024
Notification of results to applicants	late September 2024
Publication of successful applicants	late October 2024
Start of research	November 2024

Note:

*Prior notice is not a requirement for application but will be used as reference information for this call. Prior notice will be given to JST by Japan-side PI. For details, please refer to JST's Call webpage.

*The above details (except the application deadline) are subject to change.

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.

The funding amount from EPSRC to the UK applicants will be up to 1.33 million British Pounds per project at 80% of its full economic cost for a maximum project duration of up to 41 months.

A maximum of three 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.
More detail about Japan eligible researchers and institutions can be found in ‘Call text appendix’（「募集要項別紙」）.

- Requirements for UK-side research team: Applicants in the UK must meet the standard UKRI and EPSRC 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/apply-for-funding/how-to-apply/check-if-you-are-eligible-for-research-and-innovation-funding/eligibility-as-an-organisation/#contents-list
  Applicants in the UK must meet the EPSRC and UKRI 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).

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.

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. 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

Overview: Identical proposals are submitted to both JST and UKRI (EPSRC).
Detail: Proposals are co-developed by Japan-UK research teams, one PI

from Japan and one PL from the UK are identified in the proposals, they will jointly lead the project and be responsible for the interactions with JST and UKRI respectively.
The Japan and the UK team will need to submit their applications by parallel submission, using the designated application form (Japan-UK joint opportunity in semiconductor research (JST-EPSRC) Application Form) to draft a joint proposal and submit it to the application websites of their respective countries.
The lead Japan PI submits a proposal using JST's grant submission system (e-Rad). The proposal sets out the vision for the joint research project, the proposed methodology, and the track record of the Japan and UK researchers. It also includes the budget request for the Japan and UK sides for the project. The Japan PI then saves the submitted application and sends it to the UK partner along with any attachments.

On the UK end, the lead PL receives the application from their respective Japan counterpart. The UK PL will then submit the same proposal application on the UK side to the UKRI grant submission system.

Thereby, it is ensured that identical joint applications are submitted to UKRI as well as the JST partner by lead researchers at both ends.

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):
  日英半導体共同募集（2024 年度）
  Call Title (English):
  Japan-UK Joint Opportunity in Semiconductor Research
- For the PL's from the UK side: https://www.ukri.org/opportunity/
  Funding opportunity title: Japan-UK joint opportunity in semiconductor research (JST-EPSRC)
  The UK PL will be responsible for submitting a PDF copy of the application submitted to JST using the UK Research and Innovation (UKRI) Funding Service. For further details about using the Funding Service please refer to the 'How to Apply' section of the opportunity

on the UKRI Funding Finder.

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

Note for Japanese Applicants

I. Please follow 'Call Text appendix'（「募集要項別紙」） 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「募集要項別紙」for more info).
II. Multiple applications to this Japan-UK semiconductor joint opportunity and 2024 ALCA-Next call will be accepted.

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. 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 EPSRC 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 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.

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

will be provided to both funding agencies.

The assessment criteria

Each proposal will be assessed against the following criteria.

Criteria	Description of the criteria
1. Vision of the project	Have the applicants demonstrated how the work they are proposing: ・ is of excellent quality and importance within or beyond the field(s) or area(s) ・ 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 ・ impacts world-leading research, society, the economy or the environment
2. Contribution to carbon neutrality	Have the applicants demonstrated the potential of the work proposed to contribute to carbon neutrality, including: ・ the JST Advanced Technologies for Carbon Neutrality (ALCA-Next) objectives ・ centering and embedding environmental sustainability throughout the project aims, objectives, operations and research outcomes, considering the context of each project's specific research area, based on UKRI's Environmental Sustainability Strategy.
3. The approach to the project	Have the applicants demonstrated that they have designed their approach so that it: ・ 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 ・ if applicable, summarises the previous work and describes how this will be built upon and progressed ・ will maximise translation of outputs into outcomes and impacts ・ describes how their, and if applicable their team's, research environment (in terms of the place, its location, and relevance to the project) will contribute to the success of the work ・ provides a detailed and comprehensive project plan including milestones and timelines in the form of a Gantt chart or similar (additional 1-page A4)
4. Research partnership	Have the applicants demonstrated how the research partnership: • involves high-level international joint research aimed at enhancing scientific and technological capabilities for both countries • demonstrates a clear and feasible division of roles between the Japanese and UK research, throughout the research period • has an appropriate plan for building and expanding the international collaboration • involves research exchanges and collaborations that are equitable and mutually beneficial for both countries
5. The capability of the applicant(s) and the project team to deliver the project	Have the applicants provided evidence of how they, and if relevant their team, have: ・ the relevant experience (appropriate to career stage) to deliver the proposed work ・ the right balance of skills and expertise to cover the proposed work ・ the appropriate leadership and management skills

	to deliver the work and their approach to develop others ・ contributed to developing the modern research environment and wider community
6. Resources and cost justification	Have the applicants demonstrated how the resources they anticipate needing for their proposed work: ・ are comprehensive, appropriate, and justified ・ represent the optimal use of resources to achieve the intended outcomes ・ maximise potential outcomes and impacts
7. Ethics and Responsible Research and Innovation (RRI)	Have the applicants identified and evaluated the relevant ethical and/or responsible research and innovation considerations, and how they will be managed.

8. Project Implementation and Reporting

I. Expenditure/costs eligible for funding

Japanese team：

The following documents apply to this joint call program. Please refer to 'Call text appendix'（「募集要項別紙」）

https://www.jst.go.jp/alca/koubo/index.html

UK team：

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

https://www.ukri.org/councils/epsrc/guidance-for-applicants/costs-you-can-apply-for/

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/epsrc/guidance-for-applicants/costs-you-can-apply-for/directly-incurred-costs/#contents-list

For more detail around Directly Allocated and Indirect costs, please refer to this link:
https://www.ukri.org/councils/epsrc/guidance-for-applicants/costs-you-can-apply-for/directly-allocated-costs/#contents-list

II. Reporting

Projects will be monitored through their respective standard JST and EPSRC annual reporting processes. In addition to the funding agencies' requirements, the consortia will be requested to submit a 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

Japan Science and Technology Agency (JST)
Department of R&D for Future Creation
E-mail: alca-next@jst.go.jp

(2) EPSRC contacts

E-mail：ict.theme@epsrc.ukri.org

【Documents Change History】

Japan-UK Semiconductor Call Text Change History

Document name	Date	Change Details