KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,
RISET, DAN TEKNOLOGI
INSTITUT TEKNOLOGI SEPULUH NOPEMBER
DIREKTORAT RISET DAN PENGABDIAN KEPADA MASYARAKAT
Gedung Pusat Riset, Lantai Lobby Kampus ITS Sukolilo Surabaya 60111
Telepon: (031) 5953759 Fax: 031-5953759 PABX: 1404,1405,1330
www.its.ac.id/drpm email: drpm@its.ac.id

Nomor : **226/IT2.IV.1/B/TU.00.09/II/2024**
Lampiran : 1 (satu) set
Perihal : **Call For Proposal Hibah Penelitian Luar Negeri 2024**
Carbon Technology Research Foundation (CTRF)

Kepada Yth. : Para Kepala Departemen
Di lingkungan Kampus ITS
Surabaya

Sehubungan dengan dibukanya hibah penelitian luar negeri 2024 dari **Carbon Technology Research Foundation (CTRF)**, dengan ini diinformasikan kepada seluruh dosen dan peneliti Institut Teknologi Sepuluh Nopember (ITS) terkait peluang untuk hibah dan kerjasama penelitian dengan mitra luar negeri. Program hibah dari **Carbon Technology Research Foundation (CTRF)** ini berfokus pada ilmu pengetahuan untuk penerapan bioteknologi untuk menghilangkan karbon dari atmosfer ke dalam sistem terestrial dan laut.

Carbon Technology Research Foundation (CTRF) mendanai penelitian tentang metode baru karbon sekuestrasi yang dapat ditingkatkan efektifitasnya secara signifikan menggunakan Bioteknologi. Peran bioteknologi untuk meningkatkan proses penghilangan karbon ini memiliki peluang sebagai solusi namun masih perlu dilakukan penelitian secara intensif untuk memahami dampak dan potensialnya. CTRF mengundang peneliti untuk mengelaborasi lebih lanjut peluang ini dan menemukan metode yang efektif dalam penanganan perubahan iklim.

Topik Riset Prioritas Carbon Technology Research Foundation (CTRF) adalah :

- *Metabolic engineering in plants*
- *Soil carbon sequestration*
- *Engineering of photosynthetic organisms*
- *Biotech-enhanced weathering*
- *Ocean carbon removal*

Informasi lebih lanjut mengenai detail hibah penelitian **Carbon Technology Research Foundation (CTRF)** dapat diakses pada tautan berikut: Apply for Funding - Carbon Technology Research Foundation (ctrfoundation.com). Apabila dibutuhkan lembar pengesahan pimpinan DRPM bisa dikirimkan melalui https://linktr.ee/drpm.its dan konfirmasi ke Admin DRPM ITS wa.me/6281333250025

Atas perhatian dan kerjasamanya disampaikan terima kasih.

Surabaya, 01 Pebruari 2024
Direktur Riset dan Pengabdian Kepada Masyarakat,

Fadlilatul Taufany S.T., Ph.D.
198107132005011001

Tembusan Yth :
1. Wakil Rektor IV
2. Kepala Bagian Administrasi Umum dan Kearsipan Digital

3. Dekan Fakultas Teknologi Industri dan Rekayasa Sistem
4. Dekan Fakultas Teknologi Kelautan
5. Dekan Fakultas Vokasi
6. Dekan Fakultas Sains dan Analitika Data
7. Dekan Fakultas Teknik Sipil, Perencanaan, dan Kebumian
8. Dekan Fakultas Teknologi Elektro dan Informatika Cerdas
9. Dekan Fakultas Desain Kreatif dan Bisnis Digital
10. Dekan Sekolah Interdisiplin Manajemen dan Teknologi
11. Dekan Fakultas Kedokteran dan Kesehatan

Carbon Technology Research Foundation

Standard Terms and Conditions of Grants

CTRF funds promising research into ways to remove carbon from the atmosphere. Any CTRF Award Letter and Funding Award Agreement issued will provide research and development grant funding to the Institution in line with the standard terms and conditions contained in this document.

Key terms used in these Standard Terms and Conditions of Grants are set out in the Definitions section at the end of this document.

Variation to the Terms and Conditions: CTRF reserves the right to amend and vary these Standard Terms and Conditions of Grants or applicable policies at any time. We will publish on our website any changes to these conditions or our grant funding policies. Once published, any changes will apply to the Grant. Where there is any conflict between these Standard Terms and Conditions of Grants, the provisions of the Funding Award Agreement will take precedence.

Obligations of the Institution: The Institution agrees to perform the Research with all skill and care. The Research shall be carried out at the Research Location. The Institution shall appoint the Research Personnel, who shall be responsible for the performance of the Institution's obligations; and the Institution Representative, who will be solely responsible for supervising the performance of the Institution's obligations. The Institution shall ensure that any Consultants: are suitable and willing to carry out the obligations; and perform their obligations with all due care and diligence, in a professional and ethical manner and in accordance with guidelines agreed between the parties.

Obligations of CTRF: In consideration of the performance of the Research by the Institution, CTRF shall pay to the Institution a grant in accordance with agreed schedules. All payments made shall be to the Institution's bank account as notified in writing. CTRF reserves the right to withhold any payment payable if the Institution or any of the Consultants have not, in CTRF's sole discretion, completed their obligations contained in this agreement. CTRF shall appoint the CTRF Representative, who shall be the Institution's first point of contact in respect of the Research.

Ownership of Intellectual Property Rights: All Background IP is and shall remain the exclusive property of the party owning it (or, where applicable, the third party from whom the right to use the Background IP has derived). The Institution shall: own all rights, title, and interest in and to any Foreground IP for the full duration of such rights, wherever in the world enforceable; and be entitled to carry out, at its own expense, the drafting, filing and prosecution of all applications and the maintenance and extension, of all registrations comprised in the Foreground IP. The

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Institution shall fully and promptly disclose to CTRF all Foreground IP. All Foreground IP shall be considered Confidential Information of the Institution.

Publication rights: If the Institution, the Consultants or any other employee or student at the Institution wishes to make a Publication relating to the Research the Institution shall provide to CTRF a copy of the draft Publication.

Exploitation of Intellectual Property Rights: The Institution shall use its best endeavours to commercially exploit the Foreground IP in connection with the production, manufacture, distribution, marketing, selling, advertising, and promotion of the Technology.

Record keeping and reporting: The Institution shall, and shall procure that the Consultants shall, keep accurate and up-to-date records of the progress of the Research and the work performed by the Institution under this agreement, in accordance with good scientific practice and in sufficient detail to enable CTRF to monitor how CTRF's grant funding has been/is being spent by the Institution. The Institution shall procure that the Institution Representative shall: make themselves available to attend review meetings and/or prepare annual reports at such times and locations as may be agreed between the parties.

Royalties: During the Term and in perpetuity after the Term, the Institution shall pay to CTRF a royalty of 25% of the Net Revenue payable to the Institution in respect of the Institution's commercial exploitation of the Technology. Royalties and other sums payable under this agreement are exclusive of VAT (or similar tax) and shall be paid free and clear of all mutually agreed deductions and withholdings whatsoever unless the deduction or withholding is required by law. Royalties and any other sums payable to CTRF under this agreement shall be paid in pounds sterling ('**GBP**') and be used strictly to fund other research.

Term and termination: Upon issue of an award, any agreement will commence on an agreed Effective Date and, unless terminated earlier shall remain in force until the Agreement End Date (Term). Either party shall have the right to terminate an agreement giving the other party written notice of termination.

Jurisdiction: CTRF Grant Conditions shall be governed by and interpreted in accordance with the law of England and Wales and any disputes in connection with these Grant Conditions shall be governed.

Definitions:

Award Letter: the letter from CTRF confirming the award of the Grant and giving details of the Grant Activities.

Background IP: any Intellectual Property Rights, other than Foreground IP, that is used in connection with the Research.

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Confidential Information: means all confidential information (however recorded or preserved) disclosed by a party or it's representatives to the other party and its representatives whether before or after the Effective Date in connection with the Funding Award Agreement.

Consultants: all Research Personnel and Institution Representatives engaged in the Research.

CTRF: Carbon Technology Research Foundation CIC

CTRF Representative: The CTRF Research team (Head of Research and Research Grants Manager).

Effective Date: the date of execution of a Funding Award Agreement.

Foreground IP: any Intellectual Property Rights that arise, is obtained, or is developed by the Institution (or on behalf of Institution by the Consultants or any other third party) during, or in connection with, the Research including, without limitation, the Technology.

Funding Award Agreement: the executed specific Terms and Conditions of grant as described in the Award Letter.

Grant: the grant described in the Award Letter.

Net Revenue: the actual invoiced price in an arm's length transaction, less, to the extent identified on the invoice, any VAT and any other government taxes, duties or levies provided that where the Technology is: supplied other than in an arm's length transaction; or incorporated in another article and sold or otherwise supplied at a price which is included in the price of the other article; the Net Revenue shall be deemed to be the Net Revenue which would have been applied under this agreement, had such Technology been subject to an independent arm's-length transaction.

Publication: the publication of an abstract, article or paper in a journal or an electronic repository, or its presentation at a conference or seminar.

Research: the work to be performed by the Institution which will be fully described in schedules.

Research Location: the location or locations where the Research shall be carried out.

Research Personnel: the research personnel to be appointed who shall be stationed at the Research Location and who shall be responsible for the performance of the Institution's obligations pursuant to the Award Letter and Funding Award Agreement.

Technology: all inventions, products, designs, information, know-how, specifications, formulae, data, processes, methods, services, techniques, and other technology generated or otherwise resulting from the Foreground IP.

Term: anniversary of the Effective Date (dependent on project duration).

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Institution Representative: the representative to be appointed who shall be solely responsible for supervising the performance of the Institution's obligations pursuant to the Award Letter and Funding Award Agreement.

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Carbon Technology Research Foundation

Standard Grant Eligibility

The funding awarded by CTRF will be in the form of research grants. The following organisational and investigator eligibility criteria apply to these awards.

Eligibility of Organisation

CTRF is a global funder; we aim to fund the highest impact research programmes. All higher education institutions or public or non-for-profit research establishments are eligible to apply. For any queries about organisational eligibility please contact research@ctrfoundation.com.

Eligibility of Principal Investigator

Eligible principal investigators for a CTRF research grant must be at least one of the following:

- employed at the administering research organisation at equivalent to lecturer-level or above (tenure-track).
- hold a fixed-term contract that extends beyond the duration of the proposed project and the host organisation is prepared to provide all the normal support available to permanent employees.
- hold an externally funded fellowship. These will be considered on a case-by-case basis, please discuss with CTRF in advance of your application.

Holders or postdoctoral level fellowships are not eligible to apply for a CTRF grant. Research assistants, junior researchers or other researchers employed on short term projects are also not eligible.

Co-investigators are normally expected to meet the eligibility of a Principal Investigator.

Individuals must check their own eligibility before submitting any proposals to CTRF, any queries should be directed to CTRF at research@ctrfoundation.com.

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Carbon Technology Research Foundation

Intent To Submit Guidance

The application of biotechnology to carbon removal from the atmosphere into both terrestrial and ocean systems.

Key dates and information

Funding type:	Grant, *up to 48 months duration*
Total Fund:	Up to £2.5m, *up to 5 projects*
CTRF launch Webinar and Intent to Submit call opens:	16 January 2024
Intent to submit deadline:	26 February 2024 16:00 GMT
Full application deadline:	26 April 2024 16:00 BST
CTRF Advisory Board Meeting:	Mid-June 2024
Interview date:	w/c 1 July 2024
Earliest Project Start Date:	1 October 2024

This guidance must be read in conjunction with the Call for Proposals 2024 document before completing this form.

Overview

Carbon Technology Research Foundation (CTRF) funds research into new methods of carbon sequestration, which have their roots in nature, but which could be scaled significantly using biotechnology. The scope of biotechnology to supercharge the carbon removal process can't be underestimated, but much more research is needed to understand its potential impact. CTRF is inviting the research community to respond to this opportunity, making new discoveries in the fight against climate change.

Projects focussed on the utilisation of cutting-edge genomics and synthetic biology tools whilst investigating the role of microorganisms and plants in carbon sequestration processes are of particular interest to CTRF. These opportunities represent a snapshot of what may be possible in the application of biotechnology to the enhancement of nature-based carbon sequestration. CTRF remains open to highly transformative research which has the potential to

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disrupt and encourages researchers to engage with us in speculative discussion prior to application.

Scope

Through this Call for Proposals, CTRF will invest in cutting-edge research on the application of biotechnology to deliver enhanced, scalable solutions to carbon dioxide removal (CDR), and to a lesser extent other greenhouse gases (GHGs), such as methane (CH_4), nitrous oxide (N_2O). CTRF is interested in projects which target carbon removal from the atmosphere into both terrestrial and ocean/freshwater systems. Key research challenges have been identified by CTRF and these challenges form the priority areas of this Call. You will be provided with the opportunity to specify which priority area your proposal is most relevant to in the Full Proposal.

Research Challenges

Whilst this opportunity is open to any proposal addressing a research challenge related to enhanced carbon removal through the application of biotechnology to natural processes, CTRF particularly welcomes proposals that:

- Utilise ground-breaking technological advances in **genome editing** (eg. CRISPR-Cas) and **synthetic biology** to enhance natural sequestration by key groups of organisms: **bacteria, algae, archaea, fungi and higher plants**.
- Seek to improve the photosynthetic efficiency of **higher plants** (and **algae**) through:
    - Metabolic engineering to optimise efficiency of key enzymes.
    - Replacement of key CO_2 fixation enzymes with more efficient carboxylation enzymes or engineering of photorespiration bypass routes.
    - Optimise other components of the photosynthetic machinery.
    - Enhance light absorption through expansion of the photosynthetic active radiation spectrum.
    - Creation of novel engineered carbon-fixing pathways.
    - Modifying canopy or changing the morphology and biochemical composition of the root system.
    - Engineering aquaporins.
    - Utilising trees as carbon sinks.
- Attempt to understand unicellular & simple multicellular photosynthetic organisms (e.g. **microalgae**) role in carbon sequestration and engineer more efficient strains.
- Engineering of faster-growing strains of **macroalgae** and/or strains that produce a higher proportion of carbon in their biomass.
- Investigate the role of **bacteria** in both terrestrial and oceanic carbon sequestration. Engineering of these photoautotrophic organisms to sequester carbon more efficiently and/or to enhance their biomineralisation capabilities.
- Apply genome editing to molecular breeding of **fungi** to enhance their carbon sequestration capabilities in marine and terrestrial ecosystems.

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- Try to understand the potential of soil carbon sequestration for carbon removal; **investigate and adapt the root-soil ecosystem** and explore symbiotic relationships with microbes and fungi.
- Explore co-cultivation of nitrogen-fixing or carbon concentrating organisms such as **cyanobacteria**.
- Undertake fundamental research into the sequestration potential of **archaea**.
- The application of **biotechnology to enhanced weathering**; investigating colonies of microorganisms, plants, lichens, and fungi that co-exist in local ecology to speed up dissolution rates.
- Seek to promote **bio-enhanced mineralisation** through engineering of sub-surface microbiota.

Artificial ocean alkalinization, cell-free CO_2-fixing enzymatic systems and the generation of artificial leaves and hybrid systems (the combination of biotic and abiotic components) are peripheral to the scope of CTRF. All applicants seeking to explore the biological aspects of these carbon removal innovations are encouraged to contact CTRF for an initial remit discussion.

This list is non-exhaustive, representing a snapshot of what may be possible in the world of enhanced bio sequestration. CTRF welcomes highly innovative, multidisciplinary proposals that address a challenge related to enhanced bio sequestration. Please discuss speculative applications with CTRF at research@ctrfoundation.com.

What we expect to see in proposals

Proposals should address research challenges detailed in this call. Your proposal should:

- Be adventurous and ambitious, demonstrating high impact potential in the carbon removal space.
- Propose a credible methodology and pathway to impact, whilst demonstrating awareness of the inevitable challenges associated with scale-up of these biotechnologies.
- Detailed plans for dissemination and knowledge exchange with relevant stakeholders such as industry or government.
- Demonstrate credibility in the assembled research team alongside an effective project management plan and appropriate allocation of resources.

Project partners

Commercial, government or third sector project partners are welcomed. Each project partner should be able to demonstrate a clear interest in the project achieving outcomes and impacts relevant to its business or mission. Project partner engagement must demonstrably extend beyond an advisory role, such as by providing direct investment to support a project research activity or in-kind support, for example access to equipment or other resources or employee time allocated to research activities. **Project partners are unable to receive any funding from CTRF to achieve their project deliverables**. Any collaborators involved in an advisory capacity,

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in addition to any contract research organisation undertaking a specific (set of) deliverable(s) should be clearly described as such within the Case for Support and Justification of Resources.

Funding available

Projects can be up to 48 months in duration. Whilst there is no upper limit on the volume of funding that can be requested for an individual project, up to £2.5m has been allocated for this theme and we anticipate funding in the region of 3-5 projects. CTRF will fund the direct costs of the research plus an overhead contribution as defined in our Indirect Costs Policy.

How to apply

There are two parts to the application process: the Intent to Submit and the Full proposals. **NOTE:** the intent to submit **will be** used to assess whether the research project fits within the scope specified in the criteria above. Applicants will be advised if their Intent to Submit is considered out of scope and should not submit a Full Research Proposal.

Applicants should submit an Intent to Submit through our website by the deadline **16:00 GMT** on **26 February 2024**. You will be required to provide a list of principal and co-investigators who will likely be involved, a title, a 400-word (2,500 characters) summary of your proposed project, select appropriate keywords from the list provided, and your nominated names of up to three potential peer reviewers. Please see below 'How to apply' Part 1: Intent to Submit Guidance below for detailed instructions.

Full proposals must be submitted by **16:00 BST** on **26 April 2024**. You must apply using the specific online Call Application form and submit this with all relevant attachments. A template of the Full Call for Proposal form will be available to view prior to the closing date of the Intent to Submit, and then the online form will be available for completion from **1 March 2024** onwards. Please see Call for Proposal guidance 'How to apply' Part 2: Call for Proposal 2024 for detailed call instructions.

CTRF Standard Grant Eligibility rules apply.

Part 1: Intent to Submit

Please complete the Intent to Submit form (available on our 'Apply for Funding' section of our website). **NOTE**: Full proposals will only be considered from applicants who submitted an Intent to Submit through our website by **26 February 2024 16:00 GMT.**

The Intent to Submit requests:

- names and affiliations of principal and co-investigators in the team.
- project title.
- project summary (max. 400 words/2,500 characters) – including context, significance, and goals of the proposed project.
- opportunity to select up to 5 appropriate keywords that best match the focus areas of your project.

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- nominate up to 3 potential reviewers (with a minimum of 1) with the expertise to review your proposal and highlight any perceived conflicts.

Project Summary Guidance

We are looking for the greenhouse gas removal challenge that is going to be addressed, the need for this research and how you intend to deliver it. As a guide you could approach this as follows:

Context (the goal or ideal) - put the challenge in context of the climate crisis (what do you already know in relation to this research; what is the desired goal; explain how things should be?).

Significance (the reality) - describe the precise issue that the research will address (what do we need to know; explain how the current situation falls short of the goal or ideal; what is the significance of not addressing this problem?).

Relevance – show the relevance of the research in relation to the solutions required (why do we need to know it?).

Solution (the consequences) - set the objectives of the research and the potential impact (what are you hoping to achieve, what are the potential future outcomes?).

Next Steps

CTRF will review the Intent to Submit (ITS), assess eligibility and scope of the proposal. When your ITS submission has been assessed for scope and eligibility and is successful, you will progress to the next stage. There will also be a template Full Call for Proposals form available on our website for you to review.

CTRF will be identifying appropriate peer reviewers to review your proposal as soon as possible, using the project summary as a guide. The aim, when allocating peer reviewers to review your proposal, is to use at least one of your nominated peer reviewers, and other specialists in the field currently and on our database.

When the Call for Proposal goes live on the **26 February 2024**, and you have received a PIN code from us, you can copy and paste the information from the template Call for Proposals to the online form that will be available on our website from **1 March 2024**. Please note that the template is for your offline use only and CTRF will require the information and attachments submitted through the application form on our website.

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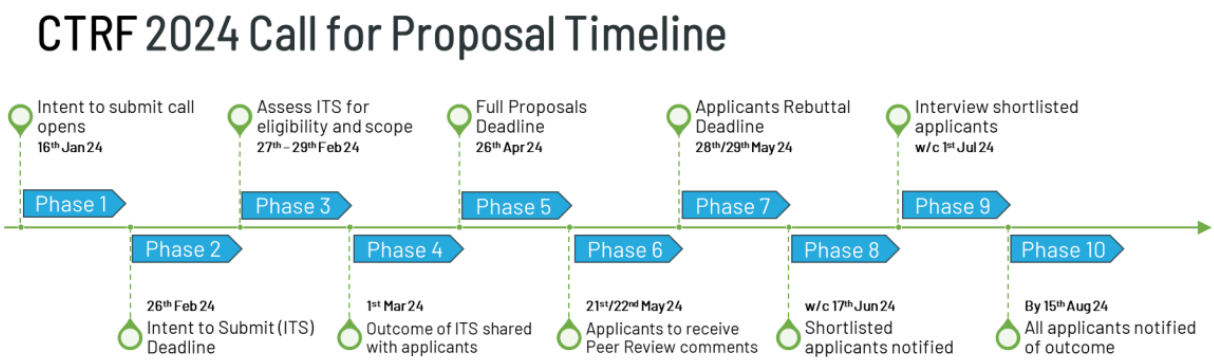
Carbon Technology Research Foundation

Key dates



Ask about this funding opportunity:

CTRF Research Team
E-mail: research@ctrfoundation.com
Telephone: 01865 648928

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Carbon Technology Research Foundation

Indirect Cost Policy

Carbon Technology Research Foundation (CTRF) funds research into new methods of carbon sequestration. Finding cost-effective, scalable solutions to carbon removal commensurate with the scale of the problem is a huge challenge and the sector urgently needs greater investment in R&D. Our mission requires us to maximise our resources, in turn maximising our impact, whilst recognising the needs of our awarded institutions and their affiliates.

As such, CTRF provides funding through its standard grants on a 'direct costs' only basis. The budget for each grant should reflect all the costs that are required for and can be tracked directly to the project. In addition, we offer a contribution to other expenses which cannot be tracked directly to the grant project, or 'indirect' costs or 'overheads.

Direct costs: These are the expenses required to execute a grant, they would not be incurred if the project did not exist. Investigator time, staff salaries, materials and consumables, equipment, travel, and subsistence are examples.

Indirect costs: These are general costs that support the entire operations of the institution/organisation, they are shared across many projects/programmes. These 'overhead' expenses would be incurred regardless of the existence of the specific project being funded. Examples include facilities expenses, estates costs, information systems and non-project dedicated administrative support staff such as HR, finance, and libraries.

Indirect cost rate: CTRF will contribute towards the indirect costs at a rate of 10% of the total direct costs of the project. For example, if the directly incurred project cost is £600k, the total indirect costs to be claimed would be £60k.

This policy provides general guidance. CTRF reserves the right to request substantiation of any grantees indirect cost rate. This policy applies to those institutions eligible to receive CTRF grants as lead institutions. For any queries relating to CTRF's Indirect Costs policy please contact: research@ctrfoundation.com.

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Carbon Technology Research Foundation

Document checklist

Please ensure that you have read, confirmed where necessary, and completed the relevant forms from the list below. The order below is our recommended order for you to read and complete the documentation.

Document/Form	Intent to Submit stage	Call for Proposal stage	Confirmation required
Read and confirm Grant Eligibility	✓Yes	✓Yes	✓ Yes
Read and confirm Terms and Conditions	✓Yes	✓Yes	✓ Yes
Read Intent to Submit guidance	✓Yes	✗ No	n/a
Read Call for Proposals guidance	✓Yes	✓Yes	n/a
Read and confirm Conflicts of Interest Policy	✓Yes	✓Yes	✓ Yes
Read and confirm Indirect costs policy	✓Yes	✓Yes	✓ Yes
Read Step by Step guide to submitting Intent to Submit, if required	✓Yes	✗ No	n/a
Complete Intent to Submit form	✓Yes	✗ No	n/a
Read Step by Step guide to submitting Call for Proposal, if required	✗ No	✓Yes	n/a
Complete Call for Proposal form	✗ No	✓Yes	n/a
Complete Budget template or equivalent	✗ No	✓Yes	n/a
Upload Case for Support supporting diagrams	✗ No	✓Yes (if required)	n/a
Upload CVs	✗ No	✓Yes	n/a
Upload Letters of Support	✗ No	✓Yes	n/a

Need any assistance? Read our FAQ's or contact us at research@ctrfoundation.com.

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Carbon Technology Research Foundation

Call for Proposals 2024

The application of biotechnology to carbon removal from the atmosphere into both terrestrial and ocean systems.

Important information

Funding type:	Grant, *up to 48 months duration*
Total Fund:	Up to £2.5m, *up to 5 projects*
Opening Date:	16 January 2024
Intent to submit:	26 February 2024 16:00 GMT
Closing date:	26 April 2026 16:00 BST
Interview date:	w/c 1 July 2024

Overview

Carbon Technology Research Foundation (CTRF) funds research into new methods of carbon sequestration, which have their roots in nature, but which could be scaled significantly using biotechnology. The scope of biotechnology to supercharge the carbon removal process can't be underestimated, but much more research is needed to understand its potential impact. CTRF is inviting the research community to respond to this opportunity, making new discoveries in the fight against climate change.

Through this Call for Proposals, CTRF will fund cutting-edge research into the application of biotechnology to deliver enhanced, scalable solutions to carbon sequestration. Projects focussed on the utilisation of cutting-edge genomics and synthetic biology tools whilst investigating the role of microorganisms and plants in carbon sequestration processes are of particular interest to CTRF. Key research challenges have been identified and these will form the priority areas of this Call. These opportunities represent a snapshot of what may be possible in the application of biotechnology to the enhancement of nature-based carbon sequestration. CTRF remains open to highly transformative research which has the potential to disrupt and encourages researchers to engage with us in speculative discussion prior to application.

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Projects can be up to 48 months in duration. Whilst there is no upper limit on the volume of funding that can be requested for an individual project, up to £2.5m has been allocated for this theme and we anticipate funding in the region of 3-5 projects. CTRF will fund the direct costs of the research plus an overhead contribution as defined in our Indirect Cost Policy (available on our 'Apply for Funding' page under 'Key documents' section on our website).

There are two sections to the application process: the Intent to Submit and the Full proposals. **NOTE:** the intent to submit **will be** used to assess whether the research project fits within the scope specified in the criteria above. Applicants will be advised if their Intent to Submit is considered out of scope and should not submit a Full Research Proposal.

Applicants should complete an Intent to Submit by 16:00 GMT on **26 February 2024**. You will be required to provide a title, a 2,500 characters (roughly 400 words) summary of your proposed project, 5 keywords that best describe your research proposal, your recommended 3 potential reviewers and a list of principal and co-investigators who will likely be involved. Please read Intent to Submit Guidance 'How to apply Section 1: Intent to Submit' for details on how to apply online.

Full proposals must be submitted by 16:00 BST on **26 April 2024**. You must apply using the specific Call Application form available through our website and submit this with all relevant and requested attachments. A template of the Full Call for Proposal form will be available for you to review all the questions. Please note that the template document is for your use only and CTRF will require the information submitted through the application form on our website.

Please see How to apply Section 2: Full Proposal section for detailed instructions and the CTRF Step-by-step guide to Call for Proposal submission document for the online submission through our website (available on our 'Apply for Funding' page on our website).

CTRF Standard Grant Eligibility rules apply (available on our 'Apply for Funding' page under 'Key documents' section on our website).

Background

By 2050, an estimated 10 Gt of CO_2 /pa need to be removed from the atmosphere to meet the goals of The Paris Agreement, with this number expected to double by the end of the century. Finding cost-effective, scalable solutions that are commensurate with the scale of the problem is a huge challenge facing the scientific community and why the carbon removal sector urgently needs greater investment in R&D.

CTRF was founded in 2020, to fund research programmes which target the enhancement of natural carbon sequestration processes. Biological systems for carbon capture and sequestration offer some potential advantages over physical and chemical alternatives, including for example, self-replicating organisms and harnessing the energy of the sun. Despite its potential, the scale up of natural processes through the application of biotechnology is poorly understood and underfunded.

Carbon Technology Research Foundation CIC
46 Woodstock Road, Oxford OX2 6HT
Company number 12856140*
*Limited Company Registered in England Wales
Registered Office: 5 Deansway, Worcester, Worcestershire WR1 2JG

Carbon Technology Research Foundation

Who can apply

CTRF is a global funder; we aim to fund the highest impact research programmes. Researchers in higher education institutions or public or not-for-profit research establishments are eligible to apply for a CTRF grant. Please see CTRF's Standard Terms and Conditions of Grants (available on our 'Apply for Funding' page under 'Key documents' section on our website).

Eligible principal investigators for a CTRF standard research grant must be at least one of the following:

- employed at the administering research organisation at equivalent to lecturer-level or above (tenure-track).
- hold a fixed-term contract that extends beyond the duration of the proposed project and the host organisation is prepared to provide all the normal support available to permanent employees.
- hold an externally funded fellowship. These will be considered on a case-by-case basis, please discuss with CTRF in advance of your application.

Applicants can be the **lead/principal investigator on one proposal only** and co-investigator on additional proposals.

Scope

Through this Call for Proposals, CTRF will invest in cutting-edge research on the application of biotechnology to deliver enhanced, scalable solutions to carbon dioxide removal (and to a lesser extent other greenhouse gases (GHGs), such as methane (CH_4), nitrous oxide (N_2O)). CTRF is interested in projects which target carbon removal from the atmosphere into both terrestrial and ocean/freshwater systems. Key research challenges have been identified by CTRF and these will form the priority areas of this Call. You will be provided with the opportunity to specify which priority area your proposal is most relevant to in the Full Proposal under section 1 'Application Summary Information' of the application form.

Research Challenges

Whilst this opportunity is open to any proposal addressing a research challenge related to enhanced carbon removal through the application of biotechnology to natural processes, CTRF particularly welcomes proposals that:

- Utilise ground-breaking technological advances in **genome editing** (eg. CRISPR-Cas) and **synthetic biology** to enhance natural sequestration by key groups of organisms: **bacteria, algae, archaea, fungi, and higher plants**.
- Seek to improve the photosynthetic efficiency of **higher plants** (and **algae**) through:
    - Metabolic engineering to optimise efficiency of key enzymes.
    - Replacement of key CO_2 fixation enzymes with more efficient carboxylation enzymes or engineering of photorespiration bypass routes.
    - Optimise other components of the photosynthetic machinery.

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    - Enhance light absorption through expansion of the photosynthetic active radiation spectrum.
    - Creation of novel engineered carbon-fixing pathways.
    - Modifying canopy or changing the morphology and biochemical composition of the root system.
    - Engineering aquaporins.
    - Utilising trees as carbon sinks.
- Attempt to understand unicellular & simple multicellular photosynthetic organisms (eg. **microalgae**) role in carbon sequestration and engineer more efficient strains.
- Engineering of faster-growing strains of **macroalgae** and/or strains that produce a higher proportion of carbon in their biomass.
- Investigate the role of **bacteria** in both terrestrial and oceanic carbon sequestration. Engineering of these photoautotrophic organisms to sequester carbon more efficiently and/or to enhance their biomineralization capabilities.
- Apply genome editing to molecular breeding of **fungi** to enhance their carbon sequestration capabilities in marine and terrestrial ecosystems.
- Try to understand the potential of soil carbon sequestration for carbon removal; **investigate and adapt the root-soil ecosystem** and explore symbiotic relationships with microbes and fungi.
- Explore co-cultivation of nitrogen-fixing or carbon concentrating organisms such as **cyanobacteria**.
- Undertake fundamental research into the sequestration potential of **archaea**.
- The application of **biotechnology to enhanced weathering**; investigating colonies of microorganisms, plants, lichens, and fungi that co-exist in local ecology to speed up dissolution rates.
- Seek to promote **bio-enhanced mineralisation** through engineering of sub-surface microbiota.

Artificial ocean alkalinization, cell-free CO_2-fixing enzymatic systems and the generation of artificial leaves and hybrid systems (the combination of biotic and abiotic components) are peripheral to the scope of CTRF. All applicants seeking to explore the biological aspects of these carbon removal innovations are encouraged to contact CTRF for an initial remit discussion.

This list is non-exhaustive, representing a snapshot of what may be possible in the world of enhanced biosequestration. CTRF welcomes highly innovative, multidisciplinary proposals that address a challenge related to enhanced biosequestration. Please discuss speculative applications with CTRF at research@ctrfoundation.com

What we expect to see in proposals

Proposals should address research challenges detailed in this call. Your proposal should:

- Be adventurous and ambitious, demonstrating high impact potential in the carbon removal space.

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- Propose a credible methodology and pathway to impact, whilst demonstrating awareness of the inevitable challenges associated with scale-up of these biotechnologies.
- Detailed plans for dissemination and knowledge exchange with relevant stakeholders such as industry or government.
- Demonstrate credibility in the assembled research team alongside an effective project management plan and appropriate allocation of resources.

Project partners

Commercial, government or third sector project partners are welcomed. Each project partner should be able to demonstrate a clear interest in the project achieving outcomes and impacts relevant to its business or mission. Project partner engagement must demonstrably extend beyond an advisory role, such as by providing direct investment to support a project research activity or in-kind support, for example access to equipment or other resources or employee time allocated to research activities**. Project partners are unable to receive any funding from CTRF to achieve their project deliverables**. Any collaborators involved in an advisory capacity, in addition to any contract research organisation undertaking a specific (set of) deliverable(s) should be clearly described as such within the Full Application form, submitted via our website.

Funding available

In 2024 there is up to £2.5m available for grants. It is anticipated that CTRF will fund up to 5 projects.

CTRF will fund the direct costs of the research plus a contribution to eligible institution overheads at a rate of 10%. Please refer to CTRF's Indirect Costs Policy for information on how to calculate this appropriately. Projects are expected to be no more than 48 months in duration.

Equipment under £10,000 in value (including VAT) should be in the 'Directly Incurred – Equipment Costs' heading, and a single quote should be provided as part of your application. Any individual items of equipment over £10,000 which will be utilised to deliver the proposed research should be discussed with CTRF in advance of application and further guidance will be provided.

How to apply

There are two parts to the application process: the Intent to Submit and the Full proposal. **NOTE:** the Intent to Submit **will be** used to assess whether the research project fits within the scope specified in the criteria above. Applicants will be advised if their Intent to Submit is considered out of scope and should not submit a Full Call Application form.

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Stage 1: Intent to Submit

Please complete the Intent to Submit form (available on our 'Apply for Funding' section of our website). **NOTE:** Full proposals will only be considered from applicants who submitted an Intent to Submit through our website by the deadline, **26 February 2024 16:00 GMT.**

The Intent to Submit requests:

- Names and affiliations of principal and co-investigators in the team.
- Project title.
- Project summary (max. 2,000 characters /400 words) – including context, significance, and goals of the proposed project.
- Nominate 3 potential reviewers (with a minimum of at least one) and highlight any perceived conflicts.
- Please select up to 5 appropriate keywords from the words provided that best match the focus areas of your project.

Project Summary Guidance

We are looking for the greenhouse gas removal challenge that is going to be addressed, the need for this research and how you intend to deliver it. As a guide you could approach this as follows:

Context (the goal or ideal) – put the challenge in context of the climate crisis (what do you already know in relation to this research; what is the desired goal; explain how things should be?).

Significance (the reality) – describe the precise issue that the research will address (what do we need to know; explain how the current situation falls short of the goal or ideal; what is the significance of not addressing this problem?).

Relevance – show the relevance of the research in relation to the solutions required (why do we need to know it?).

Solution (the consequences) - set the objectives of the research and the potential impact (what are you hoping to achieve, what are the potential future outcomes?).

Stage 2: Full proposal

You must apply to CTRF using the specific call Application form, submitted through our website **by 16:00 BST on 26 April 2024.**

All applications received after this deadline will not be accepted. Please ensure you are aware of and comply with any internal institutional deadlines that may be in place.

Please contact CTRF for further guidance on completing your application at research@ctrfoundation.com. Your host organisation will be able to provide advice and support on completing your application.

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Attachments

In addition to the application form, the following documents must be submitted to CTRF:

- **Case for support images/infographics:** Include supplementary images/infographics only that could not be included in the Case for Support section.
- **Workplan/Gantt chart** (no more than 1 side of A4).
- **Budget template** here ***or*** **a detailed project costing printout** from your institution's costing and pricing tool.
- **CVs** (up to 2 pages of A4 each) for named:
    - PI and any Co-I's involved in the project.
    - Postdoctoral staff, researcher co-investigators and visiting researchers.
- **Letters of support** from all project partners, confirming any support being provided.
- **Host organisation letter of support** (up to 2 sides of A4) confirming agreement in principle to support the project and associated research staff for the proposed duration and confirmation of costings provided.

You should attach your documents as PDFs to avoid errors. They should be completed in single-spaced Arial size 11 font or similar-sized sans serif typeface with margins of at least 2cm. CTRF reserves the right to reject any proposal which does not comply with these specifications.

Submitting your application

The application form, case for support (supporting images/infographics), workplan, detailed costing printout, CVs and letters of support should be submitted through our website by **16:00 BST** on **26 April 2024.**

How we will assess your application

Assessment process

Stage 1: Intent to Submit

The intent to submit **will be** used to assess whether the research project fits within the scope specified in the criteria above. Applicants will be advised if their Intent to Submit is considered out of scope and should not submit a Call for Proposal. During the Intent to Submit stage, you will be asked to nominate 3 reviewers (with a minimum of at least one) from different organisations with the expertise to review your proposal. Please identify any potential conflicts to CTRF during the Intent to Submit phase, we will take these into consideration during the peer review process.

Stage 2: Full proposal

Full proposals will then undergo peer review. This involves assessment by relevant independent experts (peer reviewers), identified by CTRF with at least one of your nominated reviewers, if possible, who will score the proposal against the set assessment criteria and provide written commentary.

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You will receive a copy of the reviewer comments and be given the opportunity to provide a written response. Please note the turnaround time required for rebuttal will be strictly enforced at 7 calendar days. CTRF reserves the right to reject proposals at this stage if reviews are unsupportive.

CTRF's Scientific Advisory Council (SAC) will meet to discuss your application, the written reviews, and your rebuttal, subsequently assigning the proposal a numerical score against the selection criteria. The SAC will then produce a rank ordered list of proposals and make funding recommendations to the CTRF Board.

We have included the option to offer shortlisted proposals the opportunity to attend an interview, and therefore shortlisted applicants required for interview should expect to be contacted the week commencing **17 June 2024**. All applicants should expect to hear the outcome of their application by **15 August 2024.**

In the event of this funding opportunity being substantially oversubscribed, CTRF reserves the right to modify or extend the assessment process.

Assessment criteria

Proposals submitted to this funding opportunity will be assessed against the following criteria:

1. **Research excellence:** The novelty of the project, timeliness, ambition, and appropriateness of methodology proposed.
2. **Importance:** The proposed research has the potential to be transformative in the carbon sequestration sector. Plans for scale-up, dissemination and knowledge exchange with potential beneficiaries of the research should be demonstrated.
3. **Research team:** The applicant(s) have the track record and ability to deliver the proposed project. The balance of skills of the project team, including collaborations identified will be assessed.
4. **Resources and management:** The effectiveness of the proposed programme and the management strategy. Have the resources requested been fully justified, referring to:
    4.1. Any equipment, or the viability of the arrangement described to access equipment needed for this project, and particularly on any university or third-party contribution.
    4.2. Any resources requested for activities to either increase impact or for scale-up.
5. **Fit to scope:** Alignment of the research programme to the aims and scope of the opportunity, including whether it undertakes novel, ambitious, adventurous, and timely biotechnology to enhance biosequestration.
6. Presents a credible translation pathway for the research outputs.
7. Takes an appropriately interdisciplinary approach, considering the whole system in which the proposed research outcomes will exist.

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Nominating reviewers

As part of the Intent to Submit process you will be required to nominate up to 3 potential reviewers (at least one reviewer) with the expertise to assess your proposal. Please ensure that any nominations meet CTRF's policy on Conflicts of Interest.

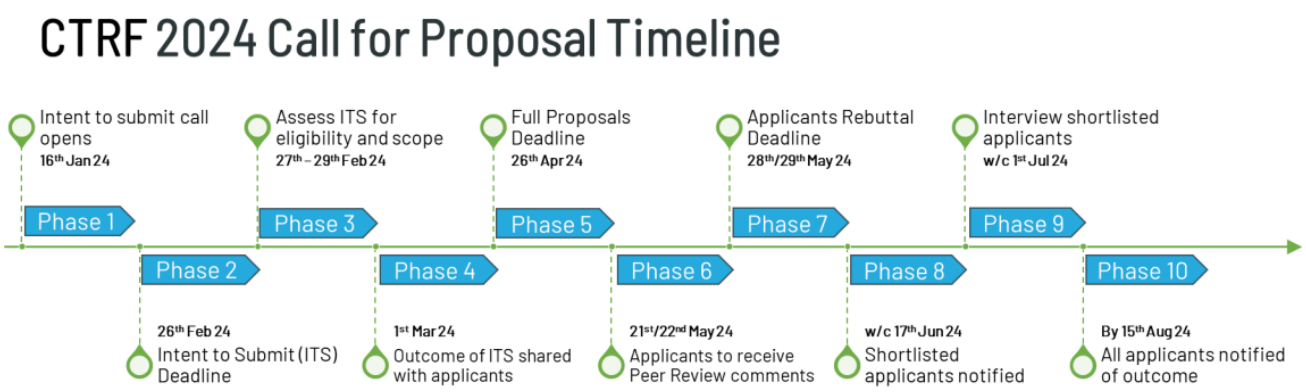
Grant conditions

Grants are awarded under the standard CTRF Standard Terms and Conditions of Grant. All queries on eligibility should be directed to research@ctrfoundation.com.

Reporting Requirements

If you are successful in securing funding, you will need to report your research outcomes and make an expenditure statement to CTRF annually. You will be provided with templates for this purpose. This will continue for up to 5 years after funding ends.

Key dates



CTRF launch webinar:	16 January 2024
Applications open:	16 January 2024
Intent to submit deadline:	26 February 2024
Application deadline:	26 April 2024
CTRF Advisory Council Meeting:	Mid-June 2024
Interview:	week commencing 1 July 2024

Supporting documents available on our website:

- **FAQs**
- **CTRF Standard Grant Eligibility**
- **Justification of Resources Policy**
- **Conflicts of Interest Policy**
- **Budget Template** (optional template for use)
- **Standard Terms and Conditions of Grant**

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Contact details

For help and advice on costings and writing your proposal please contact your research office in the first instance, allowing sufficient time for your organisation's submission process.

Ask about this funding opportunity:

CTRF Research Team
E-mail: research@ctrfoundation.com
Telephone: 01865 648 928

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