



TERMS OF REFERENCE

2024 Call for Exploratory Research Projects Under the MIT Portugal Program

Driving innovation through integrated EXPLORATORY research

DECEMBER 2024

MIT Portugal



CONTENTS

1. SYNOPSIS.....	3
2. EXPLORATORY PROJECTS TOPICS	4
2.1 AREA 1: CLIMATE SCIENCE & CLIMATE CHANGE.....	4
2.2 AREA 2: EARTH SYSTEMS: OCEANS TO NEAR SPACE.....	4
2.3 AREA 3: DIGITAL TRANSFORMATION IN MANUFACTURING	5
2.4 AREA 4: SUSTAINABLE CITIES.....	5
3. TERMS OF PROPOSALS.....	5
4. AWARD INFORMATION.....	6
4.1 REGULATIONS AND GUIDELINES	6
4.2 NUMBER OF AWARDS AND FUNDING AMOUNT	6
4.3 DURATION	7
4.4 SUPPORTING ENTITIES	7
4.5 APPLICATION DEADLINE	7
4.6 FORMAT REQUIREMENTS.....	7
4.7 OBJECTIVES AND PROPOSED EXPLORATORY PROJECTS STRUCTURE	8
4.8 REVIEW OF APPLICANTS	8
4.9 NOTIFICATION, START OF ACTIVITIES AND REPORTING	8
5. ELIGIBILITY INFORMATION.....	9
5.1 ELIGIBILITY OF ORGANIZATIONS.....	9
5.2 PRINCIPAL INVESTIGATOR (PI) AND RESEARCH TEAM ELIGIBILITY	9
5.3 LIMIT ON NUMBER OF PROPOSALS PER ORGANIZATION.....	9
6. EVALUATION AND SELECTION CRITERIA.....	10
6.1 EVALUATION PANEL.....	10
6.2 SELECTION CRITERIA.....	10
6.2.1 <i>Criterion A (40%)</i>	10
6.2.2 <i>Criterion B (35%)</i>	11
6.2.3 <i>Criterion C (25%)</i>	12
7. ADDITIONAL INFORMATION	13

1. SYNOPSIS

The [MIT Portugal Partnership 2030](#) (MPP2030) is inviting submissions for the 2024 Call for Exploratory Research Proposals.

MPP2030 is a strategic international partnership between Portuguese universities and research institutions, the Massachusetts Institute of Technology (MIT), the Portuguese government, as well as partners from industry and other non-academic institutions. Launched in June of 2018 and funded by the *Fundação para a Ciência e Tecnologia* (FCT), its goal is to strengthen Portugal's knowledge base and international competitiveness through a strategic investment in research, people, and ideas in areas of global relevance and with significant societal impact.

Potential exploratory research projects should aim to address research topics in a holistic fashion through an integrated and multidisciplinary research design with a view towards piloting and scalability involving entities of the National Research and Innovation System, other public and private partners and the Massachusetts Institute of Technology (MIT).

The proposal should target the development of research activity between MIT and Portuguese universities aiming at developing smart solutions, fostering value out of knowledge/research, promoting sustainable thinking, integrating human factors and technology, and stimulating multidisciplinary approaches.

For the 2024 call for Exploratory Project Proposals, we are seeking outstanding collaborative proposals in **four thematic areas**:

1. Climate Science & Climate Change
2. Earth Systems: Oceans to Near Space
3. Digital Transformation in Manufacturing
4. Sustainable Cities

Successful proposals are required to meet the following criteria:

- Be of exceptional quality and high relevance for Portugal. They will target innovative, high-impact research that addresses unique research needs and opportunities in Portugal.
- Take an “exploratory approach,” i.e. address an emergent research topic within the program framework that can be identified as future research domains and that can have a high impact for Portugal as a scalable living laboratory and innovation ecosystem for the development of new solutions/systems with a global reach, and for fostering an increase of competitiveness of Portuguese economy in the knowledge-based industry.
- Be designed with a view towards the long-term objective of developing innovative solutions/systems, demonstrating and leading Portugal's international competitiveness and innovative capacity in science and technology.
- Be strongly collaborative and have a clear multidisciplinary approach.

The call is open to all faculty and researchers affiliated or collaborating with Portuguese institutions of higher education and research. The total funding available for Portuguese research institutions in

this call will be up to **€ 400,000 (four hundred thousand euros)**. Research activities of participating MIT research teams will be covered directly by the MIT. The projects duration is limited to 1 year.

The deadline for submissions is **January 22, 2025, at 17:00 Lisbon time**.

For more information, email info@mitportugal.org (scientific information) or concursoprojetos@fct.pt (specific information related to application submission).

2. EXPLORATORY PROJECTS TOPICS

The present call is opened for the following **four (4) research areas**:

1. Climate Science & Climate Change
2. Earth Systems: Oceans to Near Space
3. Digital Transformation in Manufacturing
4. Sustainable Cities

The research scope of each area is described below. It is important to highlight that the research topics are not limited to the examples given in the areas' description below. Proposals with different focuses from the ones presented but within the scope of the areas are welcome. Additionally, all research areas should consider data-science integration. The data science driver should target the development of tools to collect, curate, and synthesize data from public and other repositories, and to make it available more broadly and in more useful forms for public and private use, including but not limited to the public, policy makers, consumers, and businesses.

2.1 Area 1: Climate Science & Climate Change

Climate change and global warming are urgent areas of interest to humanity. Our ability to monitor Earth's dynamic systems is enabled by collecting measurements and data on oceans, biosphere, climate, and near-space. Such data allows the understanding of how climate has changed over time and how various events are attributed to climate change, the development of complex climate models by advanced computing, as well as the assessment of natural and human systems vulnerability to climate change scenarios, and the estimation of the impact of different climate control solutions, policies and strategies. With a special focus on climate science and climate change, scientific area #1 targets the study, measurement, and modeling of the complex interactive system dynamics of climate, weather, biosphere, ocean, and near-space, taking its relations with human activities, to advance on sustainable mitigation and resilience solutions.

2.2 Area 2: Earth Systems: Oceans to Near Space

The capacity to observe Earth in its full verticality (from deep-sea to space) enables the understanding of its subsystems (oceans, land, air, and space) including complex dynamics. In this research area, the focus is on investigating Earth's subsystems, namely its oceans, land masses, atmosphere, and near space environment. There is particular emphasis on measurements, developing technologies and capabilities, and addressing Earth's critical subsystems from oceans

to space through technological innovation, big data, autonomy, and comprehensive systems analysis. Related topic areas include the development of ocean monitoring and measurement, ocean research vessel field deployments to demonstrate novel autonomy and human-machine concept of operations (ConOps) to small-satellite technology and launch capabilities, all to enable advances in ocean and earth science measurements, technology advances, and autonomous operations for exploration and science.

2.3 Area 3: Digital Transformation in Manufacturing

Today we can imagine-design-make, essentially in real-time. Human-centered design not only has inspirational effects, but it also has societal relevance, having a psychological effect, which has changed how design is seen and valued. Technology, particularly digital technology and additive manufacturing are providing a set of valuable tools capable of providing new possibilities. Within this research topic, research includes multiple aspects of the digital transformation that is enabling new integrated approaches for adaptive design, manufacturing and sustainable solutions. Projects to develop cyber physical products and systems, assuring improved user experience and value creation for society and the economy are sought. In this context, strategies for Designing at the Speed of Thought are solicited. Synergies are encouraged for research in Area #3 and Areas #1 and #2, for example, to design, manufacture and launch revolutionary Wafer Satellites and MicroSat constellations focused on land and ocean use, algae blooms, top soil erosion, and regenerative aqua- and agri-culture.

2.4 Area 4: Sustainable Cities

Cities currently have the potential to serve as living-labs and as research units for large-scale environments on Earth. Advances in open data platforms, integration and accessibility are needed for “smart, sustainable cities”. Within this area, research involves urban science, design, and engineering with applications in areas such as energy utilization, air quality maintenance, transportation systems, internet-of-things connectivity, and smart cities. Moreover, high priority will be on the ocean- city interface with relevance to Areas #1 and #2. Coastal cities are prioritized and relevant climate change, sea-level rise, temperature and natural disaster monitoring, and development of potential solutions to emerging urban problems.

3. TERMS OF PROPOSALS

The proposal should follow the attached format guidelines. The call is open to all faculty and researchers affiliated or collaborating with Portuguese institutions of higher education and research, as well as faculty and research staff at MIT.

Total funding for Portuguese institutions is limited to a maximum of **€ 400.000 (four hundred thousand euros)** with up to **€ 50.000 (fifty thousand euros)** for each of the selected projects for the intended project duration of 1 year (see 4.2. in this document).

Funding for the MIT research team participating in the project will be provided by MIT.

FCT will not fund companies or independent non-academic organizations partnering with eligible applicants.

The evaluation panel has capacity to propose different budget allocations between the selected proposals.

The **deadline for submission** is **January 22, 2025, at 17:00 Lisbon time**.

4. AWARD INFORMATION

4.1 Regulations and guidelines

Regulations and guidelines governing access to funding can be consulted on the following official documentation:

- Announcement for Submission of Proposals
- Application Guide
- Guide for Peer Reviewers
- CIÊNCIAVITAE Guide
- Ethics Self-Assessment Guide

4.2 Number of awards and funding amount

A maximum of 8 (eight) exploratory projects are expected to receive funding through the current call.

The actual number of exploratory projects funded will depend on the scale and scope of the proposed initiatives and the quality of the proposals submitted.

The total funding available for Portuguese research institutions, as part of this research call, will be up to € 400,000 (four hundred thousand euros), depending on proposal design and budget justifications. Each of the 8 (eight) exploratory projects should have a maximum budget of € 50.000 (fifty thousand euros) for the entire funding period of up to 12 months by project.

Specific collaborations with MIT faculty colleagues are highly encouraged and will be part of the evaluation. Collaborative research visits to MIT are encouraged and should be included in the budget.

Supports to be granted are non-refundable, applying the option of simplified costs in the form of a *lump sum*. The contribution is paid upon presentation of evidence and results that demonstrate the effective completion of the project as contractually agreed.

The initial advance payment for the project is 75% of the approved funding. The remaining amount, up to the approved funding for each project, is paid upon project completion, through a final reimbursement payment method.

For budget definition purposes, refer to the terms defined in the "[Methodology for Applying Simplified Costs – Lump Sums](#)", as well as to Articles 8 and 9 of the FCT Projects Regulations.

The indirect costs are a fixed rate of 25% of all the estimated direct eligible costs. The expenses for the adaptation of buildings and facilities are limited to a maximum of 10% of the project's total eligible expenses.

Funding for the MIT research team participating in the project will be provided by MIT.

Financial support could be augmented by financial and/or in-kind support provided by participating companies, and possibly by other national and local government agencies. The involved companies or other independent non-academic organizations will not be funded by FCT.

4.3 Duration

A typical proposal should cover efforts for a period of 1 year, renewable for a maximum of 3 months, in duly justified cases.

4.4 Supporting Entities

Only the following Portuguese entities are eligible to receive funding from FCT through the present call for proposals:

- Higher Education Institutions, their institutes and R&D units;
- State, international or associated Laboratories with head office in Portugal;
- Non-profit private institutions whose main objective is R&D activities, including Collaborative Laboratories (CoLab) and Centres for Technology and Innovation (CTI);
- Other non-profit private and public institutions developing or participating in scientific research activities.

4.5 Application deadline

Applications must be submitted online following the [Announcement for Submission of Proposals](#) and using the FCT's dedicated platform [myFCT](#).

Applications must comply with these *Terms of Reference* and follow FCT's guidelines for the online submission of competing grant applications.

The call is open from **December 2, 2024, to January 22, 2025, at 17:00 Lisbon time.**

4.6 Format Requirements

Full applications must meet the following format requirements:

- Completion of the online FCT form, available at [myFCT platform](#), according to the Guidelines for 2024 Call for Exploratory Research Projects under the MIT Portugal Program;
- Attachment of the "Collaboration Letter" by at least one MIT faculty or researcher with principal investigator status, describing their scientific responsibility in the project;
- Timeline file of the project tasks.

The PI, the core elements, as well as the remaining elements of the Portuguese research team, are responsible for submitting an updated version of their **CV in English** on the [CIÊNCIAVITAE platform](#).

The Statement of Commitment for the Principal Contractor will be available on myFCT platform, for agreement by the head of the Principal Contractor or someone appointed by him, following the deadline for submission of applications and up to **February 5, 2025 at 17:00 (Lisbon time)**.

Important note: All sections of the FCT form must be filled. Except where mentioned otherwise, **all the requested information needs to be in English**. Please make sure that any text entered in the online form is formatted and comprehensive.

4.7 Objectives and proposed exploratory projects structure

All exploratory projects have the long-term objective to develop innovative products and services with high export potential that should spearhead Portugal's international competitiveness and innovative capacity in science and technology, and ultimately contribute to the growth of the Portuguese economy.

When appropriate, each project should be composed of several tasks with well-defined goals and deliverables to be achieved throughout the project duration. The specific role and contribution of each task to the overall strategic objectives of the exploratory projects should be highlighted clearly.

4.8 Review of applicants

Projects will be selected on a competitive basis. Applications will be reviewed by an international panel of independent experts, organized by MIT Portugal Program Governing Committee (PGC) and FCT. The review panel will be responsible for evaluating the merit of each proposal. The selection for funding is based on the criteria presented in section 2, as well as the alignment with the MIT Portugal's mission and objectives.

The applications must follow the guidelines provided in these *Terms of Reference* and in the FCT online tools for filling in the application.

4.9 Notification, start of activities and reporting

Applicants will be notified in accordance with article 15 of the Regulations for Projects Exclusively Funded by National Funds. Funded applications are intended to start in 2025.

A final report of the Exploratory Research Project will be delivered for review by the PGC and FCT. The PGC and FCT may request that a panel of experts reviews, at any point in its progress and at its ends. Periodic status update of the project may be requested at the discretion of the PGC, FCT or the Directors of the MIT Portugal Program.

5. ELIGIBILITY INFORMATION

5.1 Eligibility of organizations

Applications must be submitted by research consortia that include:

- at least one research team from different entities as identified in section 4.4;
- a MIT researcher with principal investigator status. This participation should be confirmed by a “Collaboration Letter”, to be submitted with the proposal which describe their role in the proposal.

Beyond the entities mentioned above, the consortia may include other public or private entities, profit or non-profit, that may also invest in the exploratory project and that may bring relevant competencies to the project. However, such entities will not be funded by this call.

5.2 Principal investigator (PI) and research team eligibility

- The Principal Investigator responsible for the proposal must have a Doctoral degree by the closing date of the call, and the document certifying that degree must be presented at the time of the Acceptance Document;
- The PI should also have an employment contract or grant contract with the Principal Contractor. In the absence of such a link, at the time of the Terms of Acceptance Document a written agreement between the parties must be submitted, according to point c) of item 1 of article 6 of [FCT Projects Regulations](#);
- The PI may only submit one proposal in the quality of Principal Investigator;
- The PI and the remaining members of Portugal Research team shall be dedicated to the project, according to their participation.

Proposals will not be accepted from Principal Investigators affiliated to institutions that are on a situation of unjustified fault with FCT requirements regarding the delivery of the scientific and/or financial execution reports from previous financed projects.

Please note that applications to projects of which the Principal Investigator has been Principal Investigator of projects of whose final scientific report was rejected for reasons attributable to them within the two previous years before the tender opening are not accepted.

The members of the MIT Portugal Program governance structure (Governing Committee, External Review Committee and Program Directors) are not allowed to participate as PIs, team members, or consultants.

5.3 Limit on number of proposals per organization

There is no limit on the number of proposals to be submitted by a lead research institution and there is no limit on the number of exploratory project consortia a partner research institution may join.

6. EVALUATION AND SELECTION CRITERIA

6.1 Evaluation panel

All the accepted applications will be reviewed by international panels of independent experts, organized by FCT that will coordinate the scientific evaluation process.

6.2 Selection criteria

The selection and ranking of the applications will be based on the following criteria, detailed in the Regulations Governing Access to Funding for Scientific Research and Technological Development Projects and in the Guide for Peer Reviewers:

- A. Scientific merit (A1) and innovative nature (A2) of the project from an international standpoint – 40%;
- B. Scientific merit of the PI and the research team (B1), including the impact of project execution in developing the PI's career and/or research (B2) – 35%;
- C. Feasibility of the workplan and the expected indicators (C1), as well as the budget adequacy (C2) – 25%.

The **Merit of the Project (MP)**, is calculated according to the following formula:

$$\text{MP} = 0.40 (0.50 \text{ A1} + 0.50 \text{ A2}) + 0.35 (0.60 \text{ B1} + 0.40 \text{ B2}) + 0.25 (0.50 \text{ C1} + 0.50 \text{ C2})$$

Each criterion is scored using a 9-point scale system (1 – minimum; 9 – maximum) and rated using this scale with 0.1 increments. The final score of MP is rounded to two-decimal places. If information made available in the application does not allow for evaluating a given criterion, then the respective criterion will receive a score of 1 (one).

For a proposal to be eligible for funding, a minimum score of MP equal or higher than 7.00 points is required.

For the purpose of selection and decision-making regarding funding, projects will be ranked by the panel, in decreasing order of the MP score. At least, **one proposal per thematic area (listed in section 1) will be recommended for funding, as long as its score is higher than 7.00 points.**

In case of ties (projects with the same MP score), the ratings assigned to criteria A2, B1, A1, B2, C1 and C2 will be used sequentially and in decreasing order to provide the final ranking of the projects, for each group of thematic areas.

The assessment of these criteria shall take into account, among other considerations, the following:

6.2.1 Criterion A (40%)

This criterion aims to assess the scientific merit and innovative nature of the project from an international standpoint, considering two sub-criteria:

- A1 – Scientific merit of the project (50%)
- A2 – Innovative nature of the proposal (50%)

A1 – Scientific merit of the project (50%)

This sub-criterion is intended to evaluate the scientific merit of the proposal, considering the following dimensions, in an integrated manner:

- Suitability of the project to the goals of third phase of the MIT Portugal Program.
- Articulation of the research plan between Portugal and MIT.
- Relevance and clear identification of the project objectives and challenges addressed based on the state-of-the-art in a determined scientific area and previous work done by the proposing team.
- Thematic alignment of the proposal with the topics referred in section 2.
- Potential contribution of the research project to the advancement of knowledge.
- Potential impact of the project's outcomes on the economic, technological, and societal dimensions.

A2 – Innovative nature of the proposal (50%)

The sub-criterion A2 aims to assess the innovative nature of the proposal, considering the following aspects:

- Originality of the project proposed and breakthrough potential beyond the current state-of-the-art (e.g., novel concepts or development between or across disciplines).
- Methodological innovation and replication potential.

6.2.2 Criterion B (35%)

The criterion B evaluates the scientific merit of the Principal Investigator and the research team, analysing their curricula in an integrated way and valuing the quality of their research achievements, and analyses the relevance of the project execution for the PI's career, through 2 sub-criteria:

- B1 – Scientific merit of the Principal Investigator and the research team (60%)
- B2 – Impact of project execution for PI's career progression and/or research (40%)

According to the FCT's commitment to The Agreement on Reforming Research Assessment, as set out by the Coalition for Advancing Research Assessment (CoARA), evaluation panels are advised not to use metrics as a surrogate measure of the quality of individual outputs and applicant's contributions.

When assessing this criterion, the evaluation panel should also consider the information provided by the applicant in terms of their quality, relevance, and impact, rather than in a quantitative way and its specificities in terms of the scientific area(s) and subarea(s) of each application.

B1 – Scientific merit of the Principal Investigator and the research team (60%)

Sub-criterion B1 aims at assessing the scientific merit of the Principal Investigator, his/her contributions to science and society, and the research team profile by focusing on the information provided in the Narrative CV and Team CV synopsis fields (the CIÊNCIAVITAE CV, written in English, should only be used to confirm the information provided in those fields), considering the following parameters:

- Career profile of the PI (education, key qualifications, professional path and periods of leave from research, such as parental leave, long-term absence due to illness, volunteering, etc.).
- Contributions to the generation of new ideas, tools, methodologies, or knowledge, including publications, key data sets, software, intellectual property (patents, licences, trademarks, copyrights, novel assays and reagents), conference presentations, research and policy publications, or other scientific, technological, cultural or artistic achievements.
- Contributions to the development of individuals and/or research teams, including project participation, leadership or management, supervision of students, collaborative initiatives, and team support.
- Contributions to the research community and the broader society.
- Scientific experience, productivity and skills of the research team to adequately execute the proposed project in its specific area, focusing on the last 5 years of activities, and considering the team's configuration and the availability and commitment of its members.

B2 – Impact of project execution for PI's career progression and/or research (40%)

The sub-criterion B2 focus on how this grant is timely for the PI and the impact of the proposal in his/her career and/or research path, considering the following:

- The PI's current career stage.
- The PI's current research lines and path, and the degree of novelty regarding other previous challenges addressed by the PI.
- Timeliness and career development potential in areas such as scientific production and dissemination, team and project leadership, engagement of students/young researchers, and the ability to enable future research and to attract funding or other resources.

6.2.3 Criterion C (25%)

This criterion is intended to evaluate the feasibility of the project considering the adequacy of its several dimensions, including the proposed objectives, team, resources, and budget to achieve the expected outputs, divided into two sub-criteria:

- C1 – Feasibility of the work plan and proposed indicators (50%)
- C2 – Budget adequacy (50%)

C1 – Feasibility of the work plan and proposed indicators (50%)

Sub-criterion C1 assess the feasibility of the project considering the proposed objectives and expected outcomes, considering the following:

- Feasibility of the research project, considering the theoretical framework, the proposed research methodology and innovation, particularly its planned tasks and deliverables.
- Clear identification of the proposed activities and timelines, institutional and management resources of the Principal Contractor, and PI's and team members commitment to the project.
- Valuation of the potential of the predicted indicators (e.g., publications, communications, reports, seminars and conferences organization, patents, etc.).
- Projects in collaboration with **MIT seed projects** should be privileged. This collaboration must be confirmed by an intent letter by the PI of the ongoing seed project. It is possible for this PI to be part of the team that will participate in the project as the MIT collaboration team.
- If applicable, analysis of the risks associated, including ethical issues, to the different stages of the project should be considered, with special focus on the identified critical points and the corresponding contingency plan.

C2 – Budget adequacy (50%)

Sub-criterion C2 intends to analyse the reasonability of estimated costs associated to each task of the project considering:

- The adequacy and consistency of the estimated costs (Lump Sum) to accomplish the objectives.

7. ADDITIONAL INFORMATION

For inquires of a scientific nature, please contact the MIT Portugal Program at info@mitportugal.org.
For specific information related to application submission, please contact concursoprojetos@fct.pt.



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