

Remote Biomarker Measurements in Microphysiological Systems Pre-proposal Briefing

Rihana Bokhari, Ph.D.

Deputy Chief Scientific Officer
Translational Research Institute for Space Health (TRISH)



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SPACE HEALTH™

Agenda

Objective: provide details about the Remote Biomarkers in Microphysiological Systems RFP and answer proposer questions

- The TRISH Mission and What Does TRISH fund?
- Scientific Initiative
- Remote Biomarkers RFP
- FAQs
- Questions

TRISH MISSION

To relentlessly seek and support high-impact scientific, technological, clinical, and psychological advances that will enable any human to explore space safely.

WE COMPLEMENT NASA'S
EFFORTS

NASA

Steady Progress in
reducing space
health risks



TRISH

Risk taking for
potential GIANT
LEAPS

WHAT DOES TRISH FUND?

TRISH supports the development of health technologies and knowledge for:



Commercial Spaceflight



NASA's Artemis Program



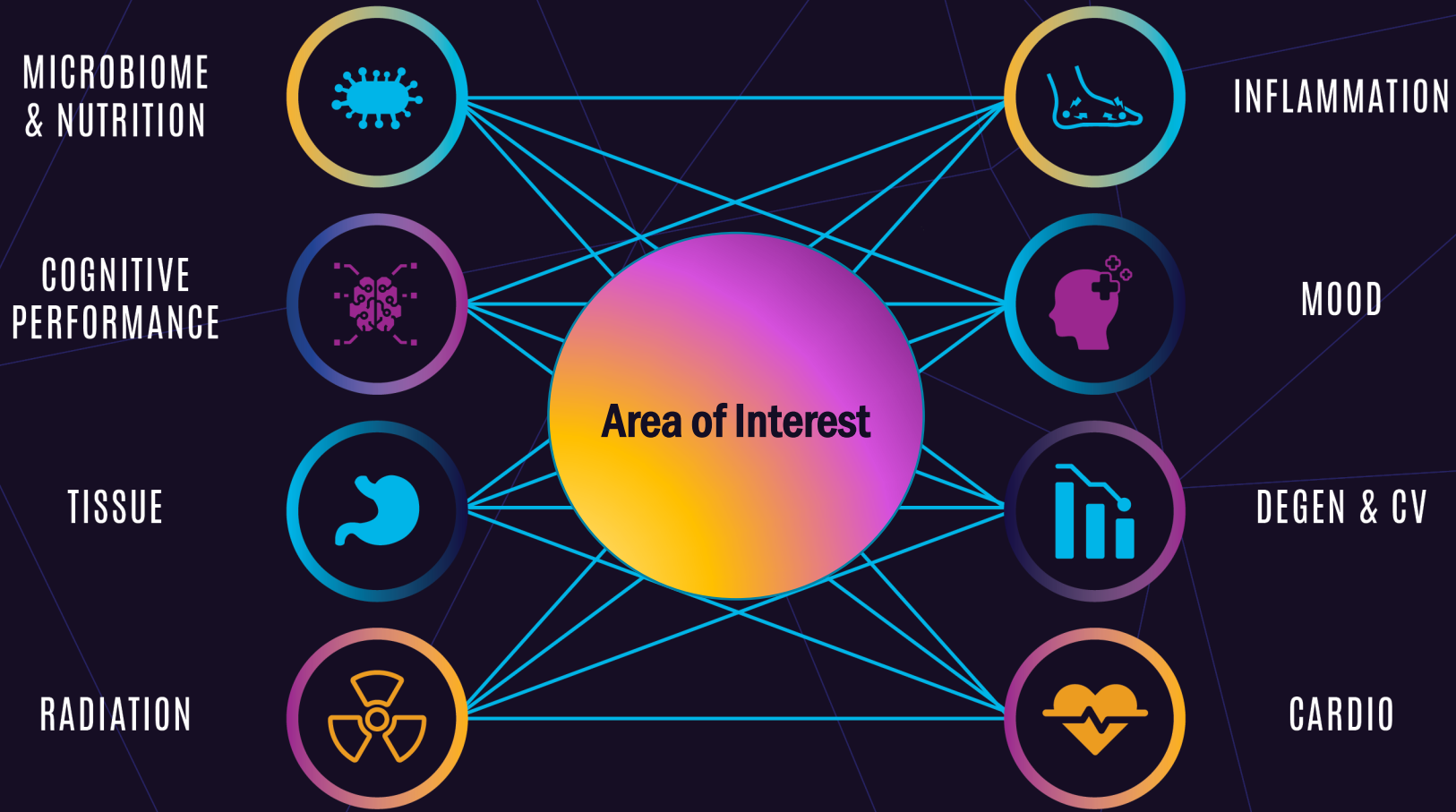
Missions to the Mars system



Advancing technologies,
discovery and creating
economic opportunities



INTERDISCIPLINARY AND CROSS-CUTTING



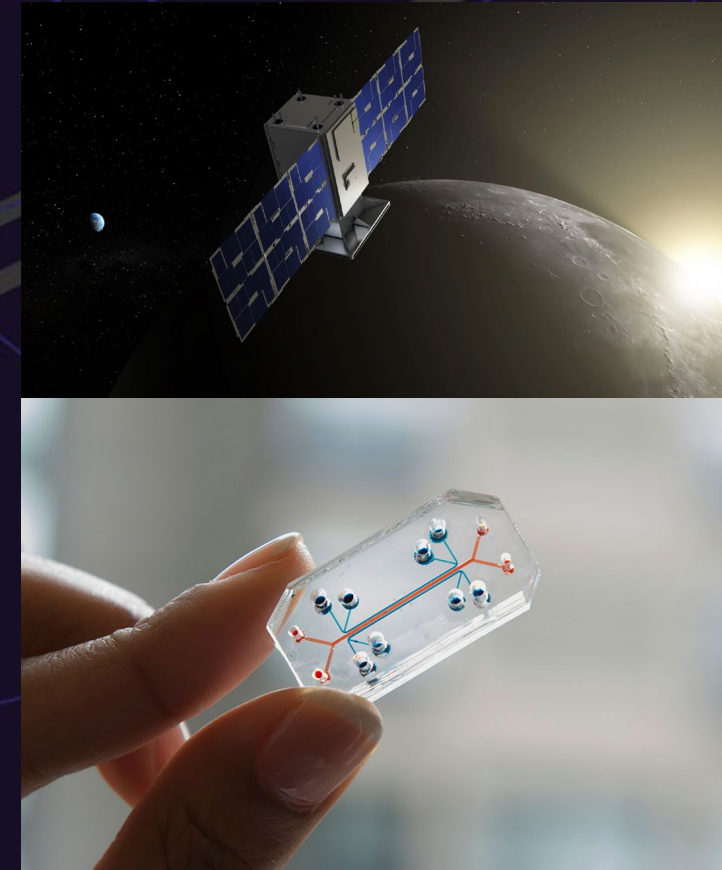
TRISH Science Initiatives

SENTINEL (Science ENTERprise to Inform Exploration Limits)

Aim – Develop automated human microphysiological systems (MPS) including non-human tending and automated sensing

Goal – Enable non-human tended MPS to be sent to deep space as a payload and relay back relevant data

Why – Microphysiological systems have the potential to address many human spaceflight risks of the space environment. By using automated and self-reporting MPS/3D tissue chips, the lunar surface and vicinity can enable critical health and performance studies. These systems can also be built as single organs or as systems of organs allowing for interactions to simulate responses that might occur within the human body in space. Successful research and technology development in this area would improve the capability to test the effects of the realistic, deep space radiation environment on a tissue as well as the impacts of medications or other interventions. In addition, these systems are also being matured and validated with the goal of facilitating personalized and precision medicine.





TRISH Broad Institute Announcement



- TRISH Research Page

TRISH Broad Institute Announcement

- <https://cdn.bcm.edu/sites/default/files/2024-12/trish-dec-2024-broad-institute-announcement.pdf>

Why are we supporting this work now?

- MPS have the potential to **address several knowledge gaps** in the impact of the deep space environment adding to and improving upon the current primary methods of **characterizing space exploration risks** that use ground analogs and the International Space Station (ISS).
- Tissue chips have the potential not only to **define new countermeasures and improve personalized healthcare** but also to explore **biological effects** in the real environment of space.
- To enable biological research in situations where there is no possibility of sample return, **advancements in current technologies** are needed to **support in-situ analysis and monitoring capabilities** during and for precision health in preparation for future missions.
- In the longer term, tissue chips could be utilized for personalized medicine: with a **customized tissue chip** of each individual space explorer sent into deep space before or together with the same space explorer, thus assisting in the overall **assessment of the risks** of the space environment on that individual's physiology.

Remote Biomarkers in Microphysiological Systems RFP

The goal of this RFP is to advance **automated analysis capabilities** in microphysiological systems (MPS; also known as **tissue chips/advanced biological systems/3D tissue/organ chips**).

This solicitation focuses on improving analysis capabilities for research advancements in biomarker, bioindicator, or biosignature measurement capabilities within or connected to an MPS that could be done during space flight and do **not require sample return**.



Key RFP Details

Release Date: December 19, 2024

Award Amount: Up to \$400,000 (direct + indirect costs)

Award Duration: 12 Months

Proposals Due: March 6, 2025 at 11:59 pm ET

Estimated Selection Announcement: May 2025

Anticipated Project Start Date: June 2025





Required Characteristics (1/2)



The list of requirements below serves as a guideline for proposing teams, outlining the functionality of the measurement tool and the robustness of the measurement system:

- The proposed method must be capable of **use within or connected to an MPS.**
- The proposed method must **provide data without the need for sample return.**
- The proposed method must **collect data autonomously** without the need for human intervention.
- **Preliminary data supporting the feasibility** of the proposed method is required within the proposal.



Required Characteristics (2/2)



- The choice of biomarker, bioindicator, biosignature or marker of MPS environment, cell function, or tissue function must be **clearly justified**.
- The proposal must address the **potential impact of the proposed method on the health of the MPS**.
- The proposed method must be **innovative**.
- The proposed method must be **robust and function effectively across various MPS**.



Preferred Characteristics



- The proposed method should be capable of being used within **multiple kinds of MPS**.
- The proposed method should be **non-invasive** to the MPS.
- The proposed method should be **non-sample destructive**.
- The proposed method should allow for data collection over **multiple time points separated by days or weeks**.
- The proposed method should be capable of **measuring more than one marker**.
- The proposed method should **avoid the use of genetic modification** because future uses of these measurement tools may include cells from individual patients for personalized medical approaches.

Reasons for Non-Review

Failure to address the specific needs outlined in the RFP will render the proposed method **unsuitable for funding** and may result in the proposal being declined without review. Some reasons for non-review include:

- Methods that are **not capable of use** within or connected to an MPS.
- Methods that **require sample return**.
- Methods that **require human intervention** for sample/data collection.
- Methods that are **not supported by preliminary data**.
- Methods that are **not innovative** in the field (for example, imaging of cardiac contractility).

Deliverables

Expected deliverables by the end of the grant are to demonstrate both functionality of the measurement tool and the robustness of the measurement system.

1. Demonstrate the tool's ability to **measure the specific biomarkers** of choice.
2. Showcase the measurement system's **robustness** and highlight its capability to **function effectively across various MPS**.

Frequently Asked Questions

Q. When will the funding decisions, regarding proposals, be made?

A. Announcement of awards will be made in June 2025.

Q. Can I request an extension for submitting my application?

A. **Extensions will not be given.** It is strongly suggested that you begin your application preparation early and familiarize yourself with the solicitation and TRISH GRID.

Q. Is there a required format for biographical sketches?

A. A NIH or NSF biosketch format is acceptable, but **there is no required format.** A template has been provided alongside the solicitation for the proposer's convenience. Regardless of the format used, please take careful note of the 2-page limit for biographical sketches.

Q. I cannot find the answers to my questions in the solicitation documents or the FAQ. Who can I ask for assistance?

A. Please ensure that you read both the TRISH solicitation and this FAQ in their entirety before contacting TRISH with questions. For additional information, please see <https://trish.my.site.com/s/concierge>.

Frequently Asked Questions

Q. Can non-U.S. companies apply to this opportunity?

A: This solicitation is open to all U.S.-based institutions and companies. Additional information regarding international participation can be found here:
<http://spacehealth.bcm.edu/res/p/applicationfaq/>.

Q. What is covered under cost-sharing?

A: Cost-share must be from a non-federal funding source.

- Salaries & benefits.
- Value of additional % effort contributed by PI.
- Equipment purchases.
- Supplies.
- Travel.
- Tuition fees.
- Indirect costs.
- Value of volunteer services towards the project



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Questions?

