Access to Space for All Initiative
HyperGES AO Webinar

UNITED NATIONS
Office for Outer Space Affairs

Access to Space for All Initiative

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Office for Outer Space Affairs

*The goal of the **Access to Space 4 All Initiative** is to provide research and orbital opportunities for UN Member States to access space and to ensure that the benefits of space, in particular for sustainable development, are truly accessible to all*

CMS

DLR

esa

JAXA

مركز محمد بن راشد للفضاء
MOHAMMED BIN RASHID SPACE CENTRE

ордена Ленина МИАН им. М.В. Келдыша РАН

Kyutech
Kyushu Institute of Technology

ZARM

AIRBUS

AVIO

SIERRA SPACE

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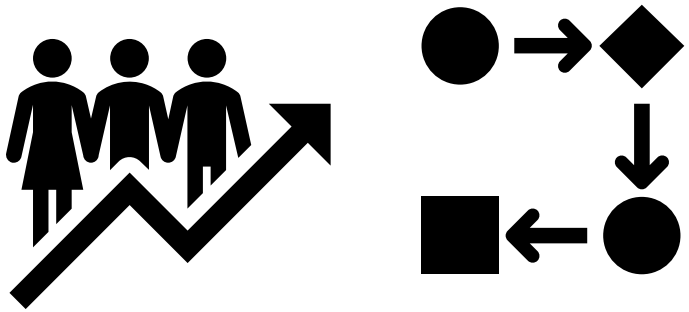
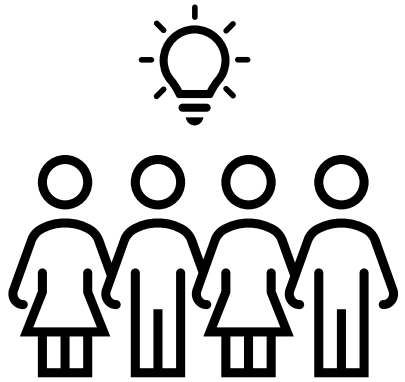
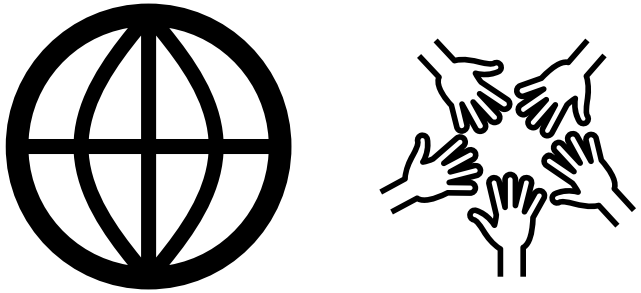


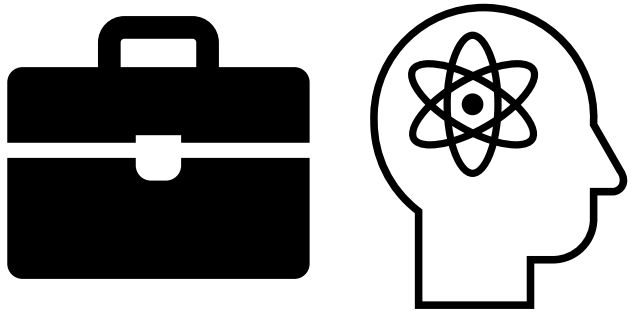
Hands-on Capacity from A-Z



Socio-Economic Impact



Fosters international cooperation



Provides cutting edge skills for jobs and other opportunities

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Space is relevant to the SDGs!

The 2030 Agenda for Sustainable Development
https://sdgs.un.org/2030agenda
To learn more about the SDGs go to https://sdgs.un.org/goals
UNOOSA SDGs page
https://www.unoosa.org/oosa/en/ourwork/space4sdgs/index.html

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Goals

4

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

← Prev Next →

Target

4.4

By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

Goals

8

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

← Prev Next →

Target

8.2

Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors

Target

8.3

Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

Goals

9

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

← Prev Next →

Target

9.1

Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

Target

9.5

Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

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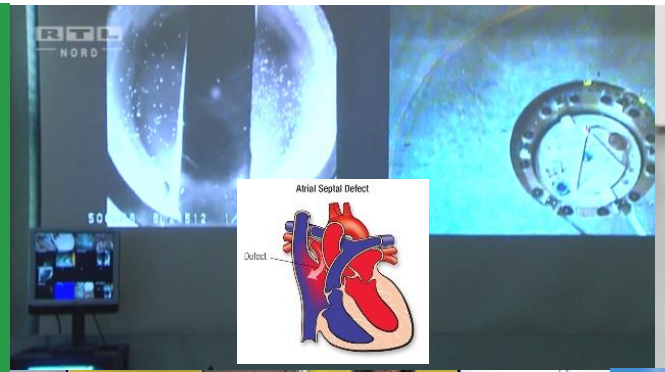
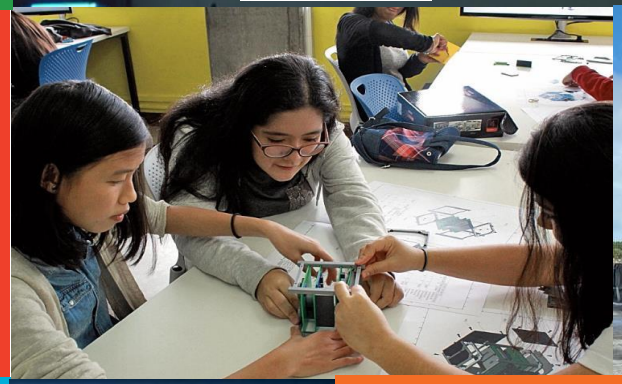
3 GOOD HEALTH AND WELL-BEING

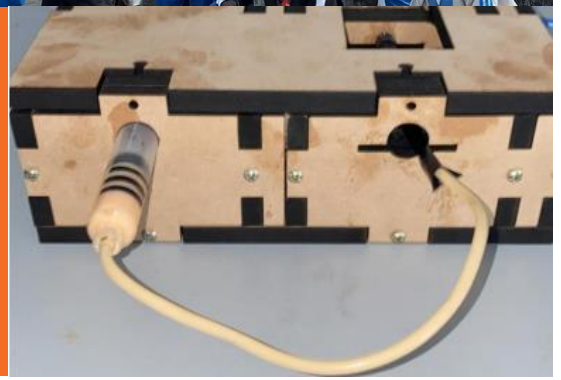


5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



SPACE4SDGS

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HYPERGRAVITY AND MICROGRAVITY

- Building capacity for conducting experiments in orbit

Hands-on opportunities in hypergravity and microgravity from ground to orbit

Education material for building up experiments

Open-source tools bridging hands-on and education components

HANDS–ON COMPONENT

- DropTES (DLR ZARM)
- HyperGES (esa)
- Suborbital and parabolic flights
- Bartolomeo (AIRBUS)
- China Space Station (CMS)
- Dream Chaser (SIERRA)

EDUCATION COMPONENT

FOR STUDENTS

- Webinars
- MOOCs
- Fellowships
- Workshops/ Trainings

FOR TEACHERS

- Teacher's Guide
- Curriculum
- Workshops/ Trainings

TOOLS COMPONENT

FOR APPLICANTS

- Design
- Planning
- Calculation/ analysation
- Validation/ testing

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SATELLITE DEVELOPMENT
- Building capacity that enables the development, deployment, and operation of satellites

Hands-on opportunities for satellite deployment

Education material supporting the whole life-cycle of satellites

Open-source tools bridging hands-on and education components

HANDS–ON COMPONENT

canSATs

PHI

KiboCUBE
JAXA

Vega-C
AVIO

EDUCATION COMPONENT

FOR STUDENTS

Webinars
MOOCs
Fellowships
Kyutech
Workshops/ Trainings

FOR TEACHERS

Teacher's Guide
Curriculum
Workshops/ Trainings

TOOLS COMPONENT

FOR APPLICANTS

Design
Planning
Calculation/ analysation
Validation/ testing

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SPACE EXPLORATION
- Broadening the engagement in space exploration

Hands-on opportunities to engage in space exploration

Education material for space exploration

Open-source tools bridging hands-on and education components

ISONscope

Ground Analogues

Beyond GEO

HANDS–ON COMPONENT

FOR STUDENTS

FOR TEACHERS

Webinars

MOOCs

Fellowships

Workshops/ Trainings

Teacher's Guide

Curriculum

Workshops/ Trainings

EDUCATION COMPONENT

FOR APPLICANTS

Design

Planning

Calculation/ analysation

Validation/ testing

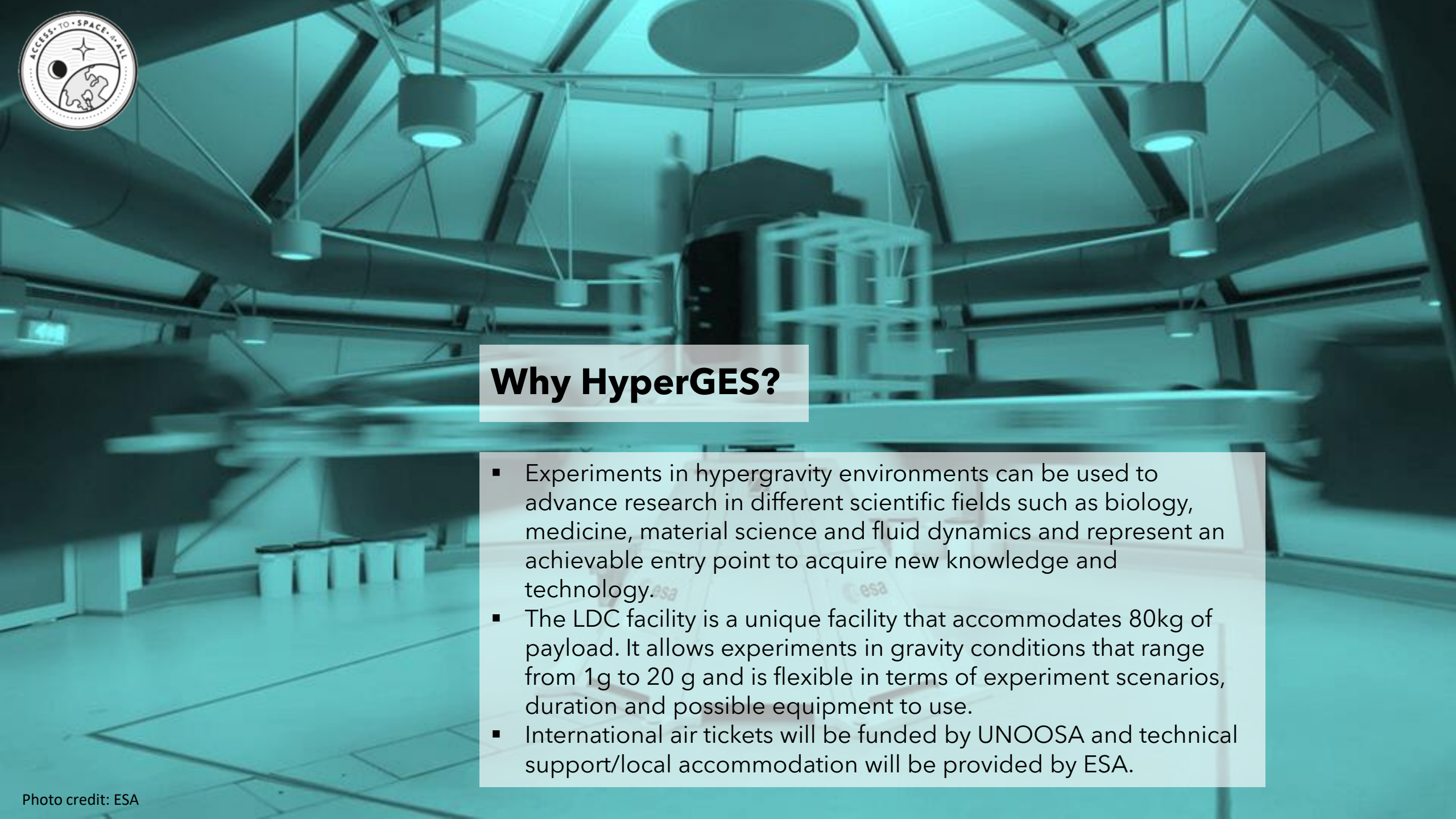
TOOLS COMPONENT

What is HyperGES?

- A cooperation programme between United Nations Office for Outer Space Affairs (UNOOSA) and the European Space Agency (ESA) which started from 2019, implemented under the Access to Space for All Initiative.

- Aims to provide opportunities for scientists and researchers with a team of students from Member Sates of the UN, with particular attention to developing countries, with opportunities to conduct their own hypergravity experiments at the Large Diameter Centrifuge (LDC) facility located at the European Space Research and Technology Centre (ESTEC) in Noordwijk, the Netherlands.

Photo credit: ESA

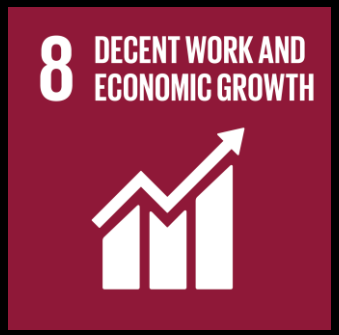


Why HyperGES?

- Experiments in hypergravity environments can be used to advance research in different scientific fields such as biology, medicine, material science and fluid dynamics and represent an achievable entry point to acquire new knowledge and technology.
- The LDC facility is a unique facility that accommodates 80kg of payload. It allows experiments in gravity conditions that range from 1g to 20 g and is flexible in terms of experiment scenarios, duration and possible equipment to use.
- International air tickets will be funded by UNOOSA and technical support/local accommodation will be provided by ESA.

Photo credit: ESA

HyperGES for the Sustainable Development Goals (SDGs)



HyperGES may contribute to the SDGs below by fostering innovation and supporting education and training on skillsets for developing cutting-edge technology.

SDG 4 "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all";

SDG 8 "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all"

SDG 9 "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"

SPACE4SDGS

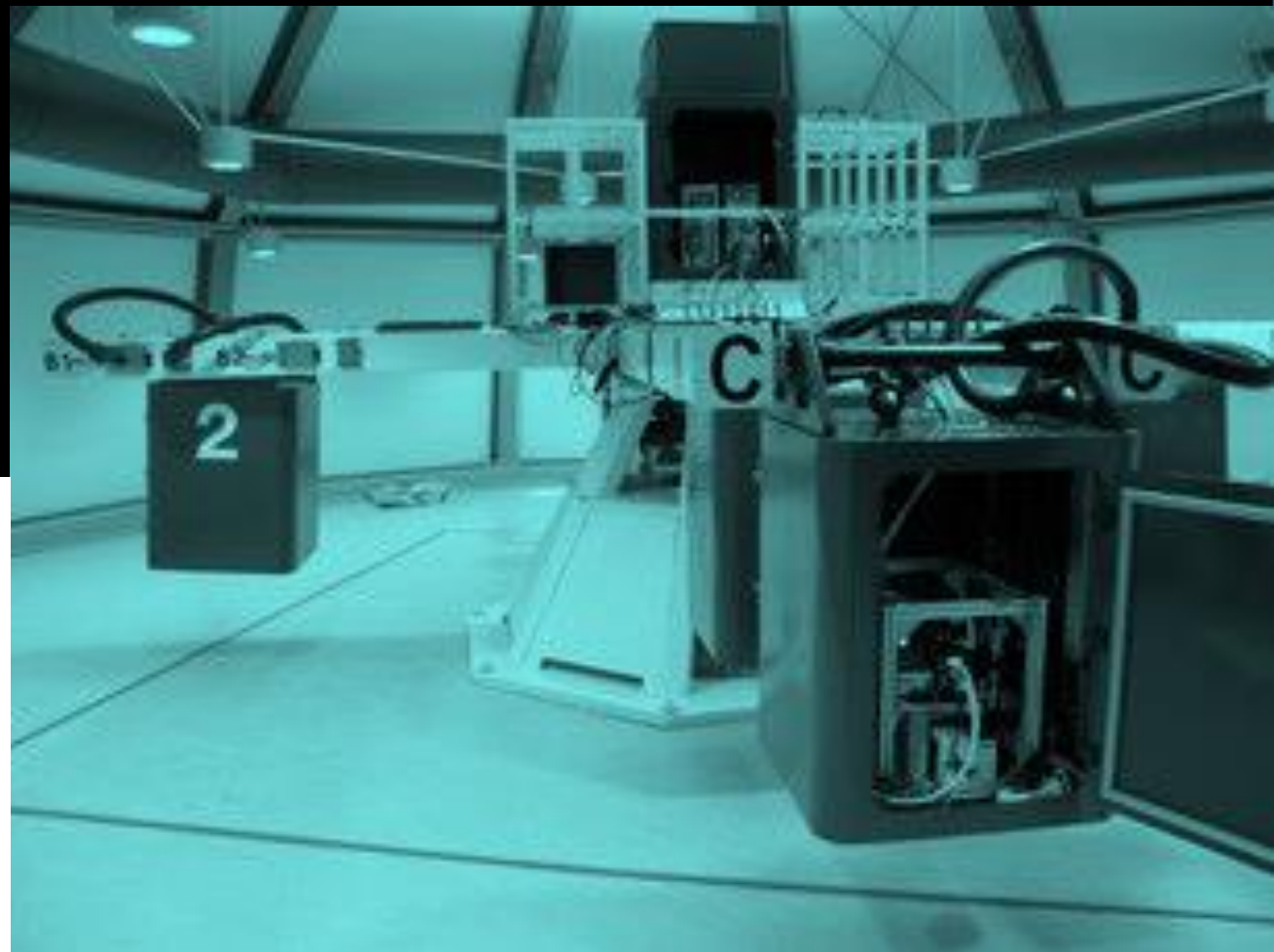


Photo credit: ESA

Why?

Article | Open Access | Published: 27 July 2021

Novel hypergravity treatment enhances root phenotype and positively influences physio-biochemical parameters in bread wheat (*Triticum aestivum* L.)

Basavalingayya K. Swamy, Ravikumar Hosamani, Malarvizhi Sathasivam, S. S. Chandrashekhar, Uday G. Reddy & Narayan Moger

Scientific Reports **11**, Article number: 15303 (2021) | Cite this article

1796 Accesses | **1** Citations | **1** Altmetric | Metrics

Regular Paper | Open Access | Published: 28 November 2016

A hypergravity environment increases chloroplast size, photosynthesis, and plant growth in the moss *Physcomitrella patens*

Kaori Takemura, Hiroyuki Kamachi, Atsushi Kume, Tomomichi Fujita, Ichirou Karahara & Yuko T. Hanba

Journal of Plant Research **130**, 181–192 (2017) | Cite this article

2848 Accesses | **12** Citations | Metrics

Hypergravity As a Tool for Cell Stimulation: Implications in Biomedicine

Giada G. Genchi[1*], Antonella Rocca[1,2], Attilio Marino[1,2], Agostina Grillone[1,2], Virgilio Mattoli[1] and Gianni Ciofani[1,3*]

[1]Center for Micro-BioRobotics @SSSA, Istituto Italiano di Tecnologia, Pisa, Italy
[2]BioRobotics Institute, Scuola Superiore Sant'Anna, Pisa, Italy
[3]Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Torino, Italy

Journal of Experimental Botany, Vol. 47, No. 297, pp. 513–517, April 1996

Journal of Experimental Botany

Effects of hypergravity on growth and cell wall properties of cress hypocotyls[1]

T. Hoson[2,6], K. Nishitani[3], K. Miyamoto[4], J. Ueda[4], S. Kamisaka[2], R. Yamamoto[5] and Y. Masuda[5]

[2]Department of Biology, Faculty of Science, Osaka City University, Sumiyoshi-ku, Osaka 558, Japan
[3]Department of Biology, College of Liberal Arts and Sciences, Kagoshima University, Kagoshima 890, Japan
[4]College of Integrated Arts and Sciences, University of Osaka Prefecture, Sakai 593, Japan
[5]Tezukayama College, Nara 631, Japan

Received 9 May 1995; Accepted 8 December 1995

HyperGES

UNITED NATIONS
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How to apply to the 2nd Round

Find the documents at
https://www.unoosa.org/oosa/en/ourwork/access2space4all/HyperGES/HyperGES_Rounds.html

❗PLEASE READ!!!!!!

- Announcement of Opportunity
- Application template
- Expression of Interest Form

HyperGES Rounds

OPEN FOR APPLICATION: from 16 May to 18 November 2022

Deadline for submitting the Application Form: 18 November 2022

Deadline for submitting the Expression of Interest Form: 31 July 2022

HyperGES is open for applications! Join us for a webinar on Thursday 23 June 2022 10:30-11:30am and 4:00-5:30pm CEST. Register from **here.**

Press release: **UNOOSA and European Space Agency open opportunity for hypergravity experiments in a ground-based centrifuge**

ANNOUNCEMENT OF OPPORTUNITY DOCUMENTS

- Announcement of Opportunity (.pdf)
- Expression of Interest form (.docx)
- Application Form template (.docx)
- Evaluation Table (.xlsx)

REFERENCE MATERIALS

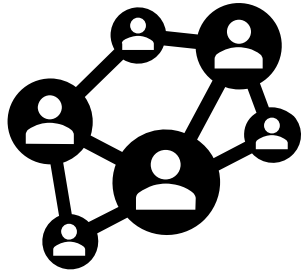
- ESA Large Diameter Centrifuge Summary
- LDC Experimenter User Manual
- LDC Technical Constraints
- Examples of past experiments
- Webinar materials: See Hypergravity/Microgravity Webinar series here

Previous Rounds

How to apply to the 2nd Round

CHECK OUT WEBINARS!!!!!!!

1) Tips for Access to Space for All Application: Various webinars that can help you such as communication/awareness raising of your project, space law/regulations, and innovative technology such as Artificial Intelligence
https://www.unoosa.org/oosa/en/ourwork/access2space4all/accspace4all_tips.html



2) Series on Conducting Research and Development in Hypergravity/Microgravity: 9 webinars that provide you with an overview of the fundamentals, special characteristics, and advantages of hypergravity/microgravity environment and further insights on the types of research, their applications and how to develop experiments for the unique environment.
https://www.unoosa.org/oosa/en/ourwork/access2space4all/accspace4all_tips.html

Announcement of Opportunity: Deadline & Opportunity

Application deadline: 18 November 2022

1. **Thematic area:** Access to Space for All -Hypergravity/Microgravity Track

2. **Title:** United Nations/European Space Agency Fellowship Programme on the Large Diameter Centrifuge Hypergravity Experiment Series (HyperGES)

3. **Subject:** Realization of a scientific and/or technological experiment in hypergravity conditions at the Large Diameter Centrifuge facility in the Netherlands.

4. **Implementation:** HyperGES is being supported by the European Space Agency (ESA), hosted by the European Space Research and Technology Centre (ESTEC) as part of ESA, executed by the United Nations Office for Outer Space Affairs (UNOOSA), and implemented through strong collaboration among UNOOSA, ESA, ESTEC, potential applicants and their organizations from Member States of the United Nations.

5. **Duration:** Approximately one year following the deadline of applications.

6. **Deadline for applications: 18 November 2022**

   Completed application forms must be submitted to UNOOSA by the deadline, via email to unoosa-access-to-space@un.org. Applicants will be notified of the outcome of their applications after selection.

7. **Hypergravity experiment:** One selected team in each cycle will spend one to two weeks at the ESA's largest centre, ESTEC in Noordwijk, the Netherlands, to conduct on-site experiment integration and perform hypergravity experiment series on the Large Diameter Centrifuge (LDC), which allows samples to be exposed to acceleration forces of 1-20 times Earth's gravity. The required actual duration for the selected team to stay in Noordwijk depends on the complexity of the experiment, the proposed experiment schedule, and the negotiation with ESTEC experts.

Announcement of Opportunity: Programme Schedule

Application	Selection	Preparation	Experiment	Reporting
6 months	2 months	7 months	2 weeks	2 months

Application phase (from announcement of opportunity to application deadline):

- Applicants to prepare their applications, following this Announcement of Opportunity (AO), the reference documents and the template of the application form along with this AO.
- Teams interested in technical consultation sessions with UNOOSA and ESA to submit the expression of interest form. **Until 31 July**
- Applicants to have their application forms signed and themselves endorsed appropriately.
- Applicants to submit their completed application forms by the requested deadline.

Selection phase (within 2 months):

- The Selection Board to make selection on a winning research team.
- UNOOSA to announce the results and notify the selected research team (SRT) and non-selected applicants of their selection results.
- The SRT to confirm with UNOOSA their participation.
- ESA expert to contact SRT to initiate their experiment preparation.

Preparation phase (within 7 months):

- The SRT to prepare their experiment in cooperation with ESA/LDC experts.
- The SRT to submit their first Experiment Progress Report (EPR) to ESA.
- The SRT and ESA/LDC experts to conduct the Critical Design Review (CDR).
- The SRT to submit their second EPR to ESA.

riment phase (within 2 weeks):

xperiment integration at the LDC facility prior to the experiment series.
lypergravity experiment series at LDC facility under different g-levels as defined.

rting phase (within 2 months):

he SRT to submit their Final Experiment Report (FER) to the Selection Board.
SA/LDC experts to submit their Feedback Report to the Selection Board.

ication phase:

he SRT to publish experiment results in journals, proceedings, and other media, if possible.
he SRT to present experiment results at conferences, workshops, and other occasions, if possible
he SRT members to include the experiment results in their Bachelor thesis, Master thesis, PhD
esis, or another form of associated research projects, if possible.
RT shall update UNOOSA and ESA with any information regarding the publications.
ers are requested to include in their peer reviewed publications, contribution to congresses and
forms of written dissemination with the following sentence:

Announcement of Opportunity: Eligibility

8. **Expected profile of applicants:** Heads of research institutions or groups, who are university/institution professors or postdoctoral researchers, with a team of Bachelor, Master and/or PhD students.

9. **Number of selected applicants:** One academic supervisor (Team Leader - Prof./PhD) with several students, who are all from Member States of the United Nations with particular attention to developing countries. However, only up to four team members, including supervisor, can be funded by UNOOSA and ESTEC, in which case the supervisor shall indicate the names of four team members to be funded in their application forms.

12. Eligibility criteria

The HyperGES fellowship programme is open to research teams from entities that are located in Member States of the United Nations with particular attention to developing countries. Each team should consist of one academic supervisor (Team Leader - Prof./PhD, not a student), and several Bachelor, Master and/or PhD students.

It is further required that the proposed experiment be an integral part of the students' syllabuses, that is, part of a Bachelor thesis, a Master thesis, a PhD thesis, or another form of research project associated with the applicants' studies at their respective universities.

The final number of team members who will participate in the experiment on site at the LDC facility depends strictly on the requirements of the experiment and is subject to approval by the Selection Board of the HyperGES Fellowship Programme. The Board reserves the right to change or limit the team size if considered necessary.

Changes to the composition of the team are NOT allowed once the application has been submitted. If, for exceptional reasons, changes are absolutely necessary, they will be subject to the approval of the Selection Board. Priority will be given to teams that have not previously participated in an experiment at the LDC facility and/or research projects that have never been conducted at the LDC facility.

The applying academic supervisors (Team Leader) will supervise the work of the students. This person must belong to the same entity as at least one of the students and will be expected to endorse the entire application (including the experiment proposal and team composition) by signing the application form, take care of development process of the team, and bear responsibility for the execution of the experiment.

In addition to the endorsement of the application form by the Team Leader, each Team Member (Team Leader and each student) must be able to show that they have their respective institutions' support through a Letter of Endorsement from their respective institutions. When seeking the Letter of Endorsement, the complete application forms should be presented to their institutions. Team Members belonging to same institution may provide one Letter of Endorsement from that institution.

Announcement of Opportunity: Selection

13. Selection criteria

The Selection Board will consist of members nominated by UNOOSA and ESA. The Board will assess all applications against the following criteria:

1) The scientific and/or technological value of the proposed experiment,
2) The relevance of hypergravity in the proposed experiment,
3) The relevance of the LDC utilisation in the proposed experiment,
4) The general feasibility of the proposed experimental setup and procedure,
5) The involvement of the proposed experiment in the students' syllabuses,
6) The organisation realising the planned research project,
7) The availability of financial resources to support development, preparation, transportation, and shipping experiment,
8) The overall presentation of the experiment proposal
9) The communication and dissemination plan
10) Inclusiveness (e.g. in case of proposals with the same score, the shares of men and women in the teams will be compared. The proposal with higher participation of women will rank higher.), and
11) the link between the project and the Sustainable Development Goals.

Announcement of Opportunity: Support

16. Financial and technical support

1) International air tickets

UNOOSA will offer the selected research team financial support exclusively for travel purposes. This may include the provision of the necessary administrative arrangements and defraying the cost of most economical economy class round-trip air tickets, in accordance with the United Nations rules and procedures, for up to four team members between their international airports of departure and Amsterdam (close to Noordwijk), the Netherlands. En-route expenses or any changes made to the air tickets must be the responsibility of the participants.

2) Technical support and local accommodation

ESA/ESTEC will offer local hotel rooms and meals free of charge for up to four members of the selected research team in each cycle during their stay in Noordwijk, the Netherlands for the on-site integration and experiment series.

ESA/ESTEC will be in charge of and operate the LDC facility itself and support the LDC experiments including their preparation and on-site integration. In addition, ESA/ESTEC will provide scientific and technical consulting, service and support to the selected team for smoothly completing the experiment cycle.

3) Experiment preparation and other costs

The selected research team will bear the expenses for the experiment development, preparation, transportation and shipping as well as insurance of the experiment. Funding to cover these costs must be obtained by the selected team, through private means or through national or international institutions. Applicants and their respective entities are therefore strongly encouraged to find additional sources of sponsorship.

Announcement of Opportunity: Submission

18. Application to the programme

The fully completed application documents of the letter of endorsement from the head of the entity (Document 1) and HyperGES Mission Application (Document 2) must be submitted to UNOOSA by 18 November 2022 23:59 CET by email to the following address:

unoosa-access-to-space@un.org

In the email, applying entities are requested to attach scanned copies of the Document 1 and the cover page of Document 2 as pdf-file (.pdf) and the entire document of the Document 2 in pdf. Please note that the UNOOSA email account only accepts emails with a size limit of up to 10 M bytes. Submission of all necessary documents (Document 1 and Document 2) is mandatory.

UNOOSA and ESA will then proceed to evaluate each submission. At UNOOSA's, or ESA's sole discretion, additional information may be requested from applicants, if necessary, to assist in the evaluation of an application. Selected applicants will then be notified with the results of the selection process. All awards are final and made at the sole discretion of UNOOSA and ESA not subject to challenge or review and, are contingent on the successful applicant's agreement to the terms and conditions of the donation agreement of UNOOSA and ESA.

Thank you!

For inquires:

UNOOSA Access to Space

unoosa-access-to-space@un.org

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