



## Announcement of Opportunity

### United Nations Human Space Technology Initiative (UN-HSTI) Fellowship Programme for “Drop Tower Experiment Series (DropTES)”

Seventh Cycle

September 2019

- 1. Thematic Area:** Human Space Technology Initiative (HSTI) Science Activity
- 2. Title:** Drop Tower Experiment Series (DropTES)
- 3. Subject:** Realization of an own scientific or technological experiment under short-term conditions of weightlessness at the Bremen Drop Tower in Germany.
- 4. Hosting Institution:** Center of Applied Space Technology and Microgravity (ZARM), University of Bremen, Germany
- 5. Supporting Agency:** German Aerospace Center (DLR) Space Administration
- 6. Executing Agency:** United Nations Office for Outer Space Affairs (UNOOSA)
- 7. Duration:** March 2020 – February 2021
- 8. Deadline for Applications:** Completed application forms must be submitted to the United Nations Office for Outer Space Affairs (UNOOSA) **by 29 February 2020**. Applicants will be notified of the outcome of the application by February 2020.
- 9. Drop Tower Experiment Series:** The drop tower experiment series consists of four drops or catapult launches to be conducted at the Bremen Drop Tower in Germany within one week. Each experiment series is accompanied by an on-site experiment integration taking place one week prior to the series week.
- 10. Expected Profile of Applicants:** Heads of research institutions or groups, who are university professors or postdoctoral researchers, with a team of Bachelor, Master and/or PhD students.
- 11. Number of Selected Applicants:** One academic supervisor (team leader - Prof./PhD) with up to four students who are from Member States of the United Nations.
- 12. Language of the Programme:** English

### **13. Brief Programme Description:**

The United Nations Office for Outer Space Affairs (UNOOSA) is pleased to announce the Fellowship Programme “Drop Tower Experiment Series” as part of the Human Space Technology Initiative (HSTI) under the United Nations Programme on Space Applications and in close cooperation with the Center of Applied Space Technology and Microgravity (ZARM) and the German Aerospace Center (DLR) Space Administration. The programme is aimed at scientists and researchers with a team of students who are from Member States of the United Nations and invites them to conduct their own microgravity experiment series at the Bremen Drop Tower in Germany.

ZARM is a scientific institute at the University of Bremen in Germany with a focus on research under space conditions and questions related to space technology. With a height of 146 meters, the Bremen Drop Tower is the predominant laboratory at ZARM and also the only drop tower of its class in Europe. It has acquired international renown during the last decades for offering experiments under the condition of weightlessness of excellent quality ( $10^{-6} g_0$ ). Moreover, scientists and engineers from all over the world benefit from the longest microgravity experiment duration on Earth (9.3 seconds with ZARM's world-wide unique catapult system; alternatively 4.7 seconds with the standard drop mode) - available up to three times a day. An experimental investigation in an environment of microgravity offers the opportunity to develop new perspectives and technologies for a wide range of research fields like gravity-relevant phenomena in fundamental physics, astrophysics, and biology and also applied sciences like fluid dynamics, combustion, chemistry, and material sciences. For the preparation of a future space mission, dedicated technology tests in microgravity are often part of a drop tower experiment series as well.

The DropTES Fellowship Programme is aimed at contributing to the promotion of space education and research in microgravity around the world, particularly for the enhancement of relevant capacity-building activities in developing countries.

### **14. Programme Outline and Schedule:**

UNOOSA offers the selected research team the opportunity to conduct one microgravity experiment series at the Bremen Drop Tower consisting of four drops or catapult launches to be conducted within one week.

#### **Timeline of the Application and Selection Process:**

Deadline for Application Submission: **29 February 2020**

Selection of Applicants: **March 2020**

**Timeline of the Experimentation Process:**

Preparation of the Drop Tower Experiment: **March - October 2020**

Drop Tower Experiment Series in Bremen: **2 - 13 November 2020**

(including experiment integration together with the selected research team on site)

Submission of the Final Experiment Report: **31 January 2021**

## 15. Requirements for Participants

### A) Eligibility Criteria

The DropTES Fellowship Programme is open to research teams from entities that are located in Member States of the United Nations. Each team should consist of up to four Bachelor, Master and/or PhD students who must be endorsed by their academic supervisor (team leader).

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 series on site at the Bremen Drop Tower depends strictly on the requirements of the experiment and is subject to approval by the Selection Board of the DropTES 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 series at the Bremen Drop Tower and/or research projects that have never been conducted at the Bremen Drop Tower.

Each team applying must be supported by one of its academic supervisors (team leader - Prof./PhD), whose role will be to 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 and development process of the team and bear responsibility for the execution of the experiment.

Applicants must be able to show that they have their respective entities' support through a Letter of Endorsement from their entities' directors.

### B) Selection Criteria

The Selection Board will consist of team members from UNOOSA, ZARM and DLR. The Board will assess all applications against the following criteria: (i) the scientific and/or technological value of the proposed experiment, (ii) the relevance of microgravity in the proposed experiment, (iii) the relevance of the drop tower utilisation in the proposed experiment, (iv) the general feasibility of the proposed experimental set-up and procedure, (v) the involvement of the proposed experiment in the students' syllabuses, (vi) the organisation realising the planned research project, and (vii) the overall presentation of the experiment proposal. The entire selection process will be performed in a single step.

### C) Requirements for Experimentation

**In terms of the experimentation and the preparation of a drop tower experiment / the experimental setup it is mandatory to refer to the ZARM Drop Tower User Manual, which is downloadable at ["https://www.zarm.uni-bremen.de/en/drop-tower/experiment-support.html"](https://www.zarm.uni-bremen.de/en/drop-tower/experiment-support.html).**

**Further general information on the Bremen Drop Tower - e.g. "How does the drop tower work?" or "What is the catapult system?" - and a detailed overview on former drop tower experiments / projects are given at ["https://www.zarm.uni-bremen.de/en/drop-tower/general-information.html"](https://www.zarm.uni-bremen.de/en/drop-tower/general-information.html).**

## **D) Schedule of the DropTES Fellowship Programme**

### **March 2020:**

- Selection of the winning research team by the Selection Board
- ZARM expert contacts the selected research team (SRT) to initiate the experiment preparation once the team confirms its participation.

### **March - October 2020:**

- Experiment preparation in close cooperation with ZARM experts
- Submission of the first Experiment Progress Report (EPR) by SRT at the beginning of May
- Critical Design Review (CDR) with ZARM experts soon afterwards
- Submission of the second EPR by SRT at the beginning of September
- Transfer of the experiment and further required equipment to the Bremen Drop Tower in Germany in October or November depending on customs issues

### **November 2020:**

- One week of experiment integration at the Bremen Drop Tower prior to the series week
- One week drop tower experiment series with four drops or catapult launches

### **December 2020 - January 2021:**

- Submission of the Final Experiment Report (FER) by SRT

### **February 2021 - ... :**

- Publications of results in journals, proceedings, and others by the research team if possible
- Presentations of results at conferences, workshops, and others by the research team - if possible
- Part of a Bachelor thesis, a Master thesis, a PhD thesis, or another form of research project associated with the drop tower experiment series

## **16. Financial Support**

The selected research team will be offered financial support exclusively for travel purposes. This may include the provision of most economical economy class round-trip air tickets between the participants' international airport of departure and Bremen. En-route expenses or any changes made to the air tickets must be the responsibility of the participants.

In this context it has to be noted that UNOOSA will not bear the expenses for the preparation, transport and shipping as well as insurance of the experiment. Funding to cover these costs must be obtained separately, through private means or through national or international institutions. Applicants and their respective entities are therefore strongly encouraged to find additional sources of sponsorship.

The drops or catapult launches are sponsored by DLR Space Administration. The technical support provided by ZARM is included in those sponsored drops or catapult launches and therefore free of charge.

For the stay of the student team in Bremen, ZARM will provide free of charge its on-site apartment at the drop tower facility, which has two separate rooms with two beds in each room, a bathroom, and a common kitchen. The ZARM apartment can accommodate up to four people.

The academic supervisor (team leader) of the students will be accommodated in a nearby hotel, which shall be basically located in walking distance from the Bremen Drop Tower. Accommodation expenses for the stay of the academic supervisor will be covered by UNOOSA.

#### **17. Application to the Programme:**

The fully completed application, properly endorsed by the applicant's entity, should be emailed to [hsti-droptes@un.org](mailto:hsti-droptes@un.org) both in PDF format (.pdf) containing the signature page, and in MS WORD (.doc), **no later than 29 February 2020.**

UNOOSA will then proceed to evaluate each submission. At UNOOSA'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, not subject to challenge or review, and are contingent on the successful applicant's agreement to UNOOSA's terms and conditions of the donation agreement.

#### **18. Additional Information:**

The latest information on the HSTI DropTES Fellowship Programme will be made available on the website of UNOOSA:

<http://www.unoosa.org/oosa/en/ourwork/psa/hsti/capacity-building/droptes.html>

For further information regarding the Fellowship Programme and applications, please contact:

[hsti-droptes@un.org](mailto:hsti-droptes@un.org)