



2025 Space Hackathon

Call for experts & jury

The Space Hackathon 2025 invites scientists, engineers, artists, and innovators to tackle one of three challenges in engineering, art, and biology. Participants will work in teams, with guidance and support from The Spring Institute and external experts. Shortlisted teams will be invited to regional events for the final round! The European in-person event will be hosted in Toulouse by the UNIVERSEH Alliance on 31st March.

The Spring Institute for Forests on the Moon is a non-profit organization with the goal of democratizing space access and developing solutions to establish sustainable ecosystems on the moon and beyond.

UNIVERSEH is an alliance of seven young and mature universities from seven European countries. It was established in November 2020 to develop a new way of collaboration in the field of Space, within the new "European Universities" initiative promoted by the European Commission.

To help us organise this event we are looking for experts and jury. Please contact universeh@univ-tlse2.fr for more information.

This year's challenges

Challenge 1: The Game of Life [Focus: Art and Engineering]

Themes: Game Design, Ecosystem Modelization

Description: Design a video game (or board or card game) based on the ecosystem models developed by Spring.

Challenge 2: Explore Citizen Science Uses for Terrascope

Themes: Closed Ecosystems, Citizen Science





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Description: Spring has designed a standard terrarium to distribute 1,000 of them globally. The goal is to empower closed-ecosystem research with a standardized platform. Your task is to design citizen science experiments that can be conducted using Terrascope.

Challenge 3: Fastest Track to a Biosphere on the Moon [Focus: Engineering Biology Design]

Themes: Miniaturization, Closed Ecosystems

Description: What is the fastest way to establish a sustainable biosphere on the Moon, regardless of its size? Consider what the biosphere would contain, how it would be transported to the Moon, and how its survival could be ensured for decades.

Qualities of Experts for Each Challenge

We are looking for experts who can help mentor teams during the remote portion of the hackathon (01/12/2024-01/02/2025) and to mentor the finalists in the last month of preparation.

Being an expert is a commitment to spend time mentoring and building up the skillset of the participants. We estimate that **between 6 and 10h over 4 months** will be necessary to do this properly. As an expert, you should expect to be matched with up to 8 teams in the pre-selection phase of this hackathon, and with one single team in the final phase. The following timeline sets the expected time commitment for and periods that experts should expect to spend if they elect to join the team.

Spring wants to celebrate the experts who are volunteering their time to this effort, expect your picture and bio to circulate on Spring's social media!

Challenge 1: The Game of Life [Focus: Art and Engineering]

Expert Qualities:

1. Game Design Expertise:

- Knowledge of video game mechanics or board/card game design.



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- Experience in balancing gameplay with educational or scientific content.
 - Understanding of how to integrate ecosystem models into engaging game formats.
2. Ecosystem Modeler/Biologist:
- Proficient in ecosystem dynamics and able to guide teams on accurately modelling ecosystems in games.
 - Experience in translating complex biological systems into interactive experiences.
3. Art and Narrative Design:
- Ability to advise on visual design and storytelling elements to ensure the game's narrative is compelling and reflective of the ecosystem's mechanics.
 - Experience in creative media, animation, or interactive design.
4. Systems Thinker:
- Ability to look at the game as a complex system, ensuring all parts work together fluidly, from gameplay to ecosystem accuracy.

Challenge 2: Explore Citizen Science Uses for Terrascope

Expert Qualities:

1. Citizen Science Specialist:
- Experience in designing large-scale participatory research projects.
 - Ability to create experiments that are simple, replicable, and accessible to non-experts while ensuring scientifically meaningful data.
2. Ecosystem Scientist:
- Expertise in closed ecosystems or biospheres, particularly in how to standardize and optimize conditions for meaningful data collection across distributed experiments
 - Understanding of environmental controls and biological feedback loops within small ecosystems.
3. Data Science and Analytics Expert:

- Strong background in data collection, management, and interpretation, especially in citizen science.
- Ability to guide teams on how to maximize data quality, consistency, and scale.

4. Logistics/Scaling Expert:

- Experience in maximizing data output from global experiments, ensuring protocols are scalable and adaptable across different environments.
- Familiarity with distributed sensor systems and platforms (like the Terrascope) that participants will be using.

Challenge 3: Fastest Track to a Biosphere on the Moon [Focus: Engineering Biology Design]

Expert Qualities:

1. Space Biologist:

- Knowledge of space ecosystems, particularly biosphere design for extreme environments like the Moon.
- Expertise in the survival of biological systems in low-gravity or radiation-rich environments.

2. Systems Engineer (Space/Environmental):

- Expertise in space transport, miniaturization of life support systems, and biosphere maintenance.
- Ability to advise on engineering solutions for transporting ecosystems, resource efficiency, and longevity of biospheres.

3. Sustainability Expert:

- Deep understanding of how to create self-sustaining biological systems that can endure for decades.
- Expertise in resource recycling, energy management, and ensuring ecosystem resilience.

4. Materials Scientist/Transport Specialist:

- Expertise in packaging and transporting delicate biological systems to extreme environments.



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- Knowledge of how to miniaturize and protect biological systems during space transport.

Who we are also looking for jury

When selecting jury members for the hackathon, we are looking for individuals who possess the following qualities:

1. Challenge-Specific Knowledge: Jury members should have strong backgrounds in the themes of each challenge, including but not limited to:

- Game design and ecosystem modelling (Challenge 1)
- Closed ecosystems and citizen science (Challenge 2)
- Space biology and engineering design (Challenge 3)

2. General Qualities:

Strong Analytical Skills: Jury members should possess the ability to critically assess projects based on criteria such as creativity, technical execution, feasibility, and scientific rigor.

Data Analysis Background: Familiarity with data-driven decision-making will be valuable for assessing the scientific merit of participants' projects.

Enthusiasm for Emerging Technologies: Jurors should demonstrate a keen interest in the latest developments in their fields and how they apply to the challenges at hand.

Collaborative Spirit: We are looking for individuals who thrive in team settings and can provide constructive feedback to participants, fostering a positive environment.



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