

5th Annual International Space Ecology Workshop

Sept 18-19, 2026
0800-1600 Pacific Daylight Time

Closed System Ecology | Crop Production and Waste Recycling | BLSS and CELSS



The global Space Ecology Workshop is a free, virtual 2-day conference that connects academia and industry to advance the science and art of supporting diverse life in space.

Welcome Space Ecology Professionals!

Welcome to the 5th Annual Space Ecology Workshop, an international forum for discussing the ecological aspects of sustainable space habitation. We believe that there is a need to promote and organize closed ecological and bioregenerative life support (CELSS/BLSS) research internationally and reignite interest in an ecological systems approach to space habitation, especially given the current momentum for deep space exploration. We share a mutual vision of artificial closed loop ecosystems that exploit a combination of biological, ecological, and electromechanical processes to support human life.

Closed ecological systems will enable indefinite, sustainable human exploration of space as well as sustainable living on Earth. Many prior needs assessments point out similar gaps in knowledge and technology, and many obstacles remain in realizing this vision. We believe that advances will be made when we coordinate efforts and socialize these concepts globally. We hope this workshop can provide inspiration and momentum to that end, and that there will be many more. We are so glad you've joined us!



Major Themes Include:

Enabling a Sustainable Presence in Space: Maintaining a permanent presence in space is untenable without a degree of self-sufficiency. We discuss technologies that contribute to mission longevity by enhancing crew health, closing material or energy loops, and replacing or reimagining physio-chemical life support systems.

Closed Ecological Systems for Deep Space: The understanding and development of artificial ecosystems are critical to achieve long term goals in life support and physical and mental health needs for crew. A major goal of this workshop is to coalesce research on closed ecological systems: highlight applicable existing research, identify gaps in knowledge, and coordinate future high-priority research.



Crop Production and Waste Recycling: Closing the material loop in food production and waste recycling systems is necessary to reduce reliance on regular resupplies. Extensive space agriculture will be a prerequisite for space habitats with permanent residents. Topics of interest include: improving yield, designing with automation, crop cultivar selection, and water and nutrient delivery systems.



2026 Space Ecology Workshop Agenda

Day 1, September 18, 2026. All times in Pacific Daylight Time (PDT)

8:00 - 8:15am	Opening Remarks Patrick Grove, The Spring Institute for Forests on the Moon
8:15 - 9:00am	Featured Speaker Lucie Poulet, University of Clermont Auvergne & MELiSSA Foundation: <i>MELiSSA: European circularity and regeneration for deep space missions</i>
9:00 - 10:00am	Morning Presentations Luke Fountain, NASA Kennedy: <i>Harnessing Plant Nitrogen Physiology to build Intelligent Controlled Environment Agriculture</i> Frieda Taub, University of Washington: <i>Nutrient Recycling is The Critical Process in Closed Ecological Systems</i>
10:00 - 10:30am	Coffee Break & Breakout Room Discussion
10:30 - 12:00pm	Morning Presentations, Continued Ravinderjit Kaur Sandhu, Université de Montréal Canada: <i>The Regolith-Rhizosphere Interface: Linking Substrate Properties, Plant Growth and Root Responses for Space Agriculture</i> Heather Smith, LA Plant Genetics: <i>Production of Cotton and Bast Fibers from Food Waste</i> Michael Kamp, Honeycomb Hydro LLC: <i>Industrial Hemp in Closed Ecological Life-Support Systems: A Framework for Evaluating Crop, Material, and Resource-Cycling Value</i>
12:00 - 1:00pm	Lunch Break & Breakout Room Discussion
1:00 - 1:45pm	Featured Speaker Daniel Barta, NASA Johnson: <i>The Bioregenerative Planetary Life Support Test Complex: A Test Bed for Bioregenerative Life Support</i>
1:45 - 2:45pm	Afternoon Presentations James Ebeling, University of Alabama Huntsville: <i>NASA's Mars to Table Challenge, 2026 - UAH Mars Analog Greenhouse for production of nutritional crops for a Mars Colony</i> Phillip Sweet, NASA ARC/BMS: <i>Developing Protocols for the Space Algae-2 Mission</i>
2:45 - 3:00pm	Coffee Break



3:00 - 4:00pm	Afternoon Presentations, Continued Alex Calvo, Stockholm University / The Spring Institute for Forests on the Moon: <i>Forests on the moon: legal framework and compatibility with mining operations and human settlement</i> Marshall Porterfield, Purdue University: <i>Mycoponic Cultivation Reveals the Rhizomorphic Exudophore and Biophysical Deliquescence of Buller's Exudates: Reengineering The Fungal Mycelial Soil-Atmosphere Water Harvesting Engine for Pharmaceutical Biomanufacturing</i>
4:00 - 4:01pm	Closing Remarks Patrick Grove, The Spring Institute for Forests on the Moon



2026 Space Ecology Workshop Agenda

Day 2, September 19, 2026. All times in Pacific Daylight Time (PDT)

8:00 - 8:15am	Opening Remarks Patrick Grove, The Spring Institute for Forests on the Moon
8:15 - 9:00am	Featured Speaker Bob Morrow, Sierra Space Corporation: TBD
9:00 - 10am	Morning Presentations Jupe Vincent, Space Generation Advisory Council: <i>Space Organism Risk Index (SORI): Linking Microbial Utility Traits to Invasion Risk and Planetary Biosecurity</i> Anna Lewkowicz, ETH Zurich: <i>The Role of Biodiversity in Space Ecology</i>
10:00 - 10:30am	Coffee Break & Breakout Room Discussion
10:30 - 12:00pm	Morning Presentations, Continued Elisa Dong, York University: <i>Practical Insights from Houseplant and Aquarium Hobbyists Relevant to Growing Plants in Space</i> Frank L'Italien, Arcology Solutions: <i>ISRU Habitat Envelope Expansion From The Inside</i> Aenghus Denvir, Moon Village Association: <i>Surface mineralogy and chemistry determine the safety of crops grown on the Moon</i>
12:00 - 1:00pm	Lunch Break & Breakout Room Discussion
1:00 - 1:45pm	Featured Speaker T.H. Culhane, TBD: TBD
1:45 - 2:45pm	Afternoon Presentations Donald Jacques, EarthSeed Inc: <i>CIRES: Compact Intensive Regenerative Ecological System for Earth and Beyond</i> Morgan Raimondo, University of Washington: <i>Designing Microbial Consortia for Strengthening Plant Resilience to Space-Relevant Radiation</i>
2:45 - 3:00pm	Coffee Break
3:00 - 3:45pm	Panel - Bob Morrow, Dan Barta, Marshall Porterfield, Zaheer Ali <i>Platforms for future space ecology research.</i>
3:45 - 4:00pm	Closing Remarks Patrick Grove, The Spring Institute for Forests on the Moon





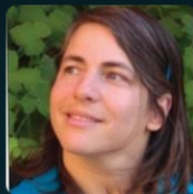
Tips and FAQs

- **Communicating with Speakers and Organizers:** Given the number of attendees, microphones are muted and videos are off by default. However, there are several other ways to communicate with the speakers and with one another:
 - **Zoom Q&A Box for Questions to Speakers:** If you have a question you would like to ask one of the speakers, please enter your questions into the “Q&A” box in Zoom.
 - **Zoom Chat for Comments and Feedback:** Please provide any comments or feedback that you would like to share with the group (other than questions for our speakers), in the Zoom “Chat” box.
- **Will the Workshop be recorded and available to watch later?**
 - **Yes!** The recordings of both days of the workshop (as well as previous years’ workshops) will be available on YouTube here:
 - <https://www.youtube.com/@spaceecologyworkshop8066>
 - Transcripts of the Zoom chat log will also be uploaded to the website after the event (www.spaceecologyworkshop.com)
- **Technical Difficulties:** If you are having trouble accessing anything or have any other technical questions, please message Patrick Grove in Zoom chat. He’s there to help!

2026 SEW Organizing Committee



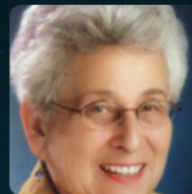
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Frieda Taub
University of
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Doug Owens
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Presentation Abstracts:

