

# Wednesday November 4th

Time Zone Europe/Brussels | GMT/UTC +1

08:30 →

Overview of ESA Exploration Program

| [Didier Schmitt, European Space Agency](#)

## Room 1

### Ground demonstration and analogue testing

09:00 →

MELiSSA Pilot Plant status and perspective

| [F. Godia, UAB MPP](#)

## Room 2

### Micro-algae Characterisation and Photo-Bioreactors

09:30 →

MELiSSA compartments integration: Continuous operation of interconnected liquid and gas phases of a packed-bed nitrifying bioreactor, an air-lift photobioreactor and a rats isolator.

| [Enrique Peiro, UAB](#)

Running a photobioreactor in space for the production of oxygen and edible spirulina biomass

| [Natalie Leys, Belgian Nuclear Research Center \(SCK CEN\)](#)

09:45 →

The connection of physical-chemical and biological processes for future closed life support systems for space applications

| [Alexander Tikhomirov, IBP SB RAS](#)

Genetic responses of metabolically active *Arthrospira* sp. PCC 8005 to chronic high-dose gamma irradiation as determined by RNAseq transcriptome analysis

| [Paul Jaak Janssen, SCK-CEN](#)

An experimental device for studies on cyanobacteria at low pressure, in the frame of BLSS

| [Cyprien Verseux, University of Bremen](#)

10:00 →

Report on LunAres Research Station new hygiene module using grey-water treatment during analog missions

| [Leszek Orzechowski, Space is More](#)

Production of high-quality edible biomass with high levels of antioxidants by genetic engineering of the photosynthetic microalga *Chlamydomonas reinhardtii*

| [Matteo Ballottari, University of Verona](#)

10:15 →

JAXA Lunar Farming Concept Study Working Group activity

| [Tetsuhito Fuse, Japan Aerospace Exploration Agency \(JAXA\)](#)

Experimental feedback on the pilot scale production of *Rhodospirillum rubrum* and challenges towards its industrial large-scale production

| [Lucie van Haver, GEPEA UMR-CNRS 6144](#)

10:30 →

Break

10:45 →

## Poster pitches

An innovative, preventive acting "bioinspired" antimicrobial surface based on peptides for space and Earth - **Matthias Dünne, Blue Horizon Deutschland GmbH/ formerly OHB System, Dept. Life Science**

The use of synthetic ecology for the sustainable production of vitamin B12 enriched algal biomass on long space missions - **Ellen Lucy Harrison, University of Cambridge**

Anaerobic biodegradation processes for organic waste utilization followed by algal biomass accumulation - **Lyudmila Vladimirova Kabaivanova, Bulgarian Academy of Sciences**

Elimination of microbial hazards for the crew in low gravity conditions using the micro- and nanocapsules filled with 8HQ for the sustained antimicrobial surface decontamination - **Oksana Travkova, University of Potsdam**

Potential for water independence from the grid on a household level by combined rainwater and greywater reuse: assessment through simulation - **Arjen Van de Walle, Ghent University, CMET**

Nutrient recovery from urine using bio-mineral producing bacteria - **Ana Soares, Cranfield**

11:00 →

11:15 →

Helical and linear morphotypes of *Arthrospira* sp. PCC 8005 display genomic differences and respond differently to acute 60Co gamma irradiation - **Paul Jaak Janssen, SCK-CEN**

Impact of carbon source and light intensity on the production of PHA by *Rs.rubrum*

| **Guillaume Bayon-Vicente, UMONS**

Characterisation of an air-lift photobioreactor with a LED based illumination system

| **David Garcia Gragera, Melissa Pilot Plant**

The effect of P starvation on nutrient uptake and cellular content of the microalgae *Desmodesmus communis* & *Chlorella protothecoides*

| **Aigars Lavrinovics, Riga Technical University**

11:30 →

Overview of experiment results from the first research campaign of the EDEN ISS greenhouse facility in Antarctica in 2018

| **Paul Zabel, DLR**

Microalgae: from oxygen and food production in Space to groundwater processing on Earth

| **Gisela Detrell, University of Stuttgart**

11:45 →

From waste to resource; closing the loops in the urban water, energy and food nexus - Amsterdam case study

| **Radu Mircea Giurgiu, SEMILLA IPStar**

Solid-Liquid Separation Technology for Biomass Harvesting in Bioreactors

| **Marie Vandermies, QinetiQ Space**

12:00 →

Biotechnology and Safety from Urban to Space Water Cycling

| **David Weissbrodt, TU Delft**

Characterization of oxygen production from photo-bioreactor for ISS cabin technology demonstrator

| **Dominique Chapuis, RUAG Slip Rings SA**

12:15 →

Cellulose wastes management by microbial degradation

| **Hristo Miladinov, The Stephan Angelov Insitute.**

Coupling urine treatment and water recycling with *Limnospira indica* cultivation

| **Neha Sachdeva, Mons University**

12:30 →

Lunch

## Modelling and system design

## Organic wastes processing and refinery

13:30 →

ALISSE Tool Status and Perspective for Space and Earth development

| **Philippe Fiani, SHERPA Engineering**

Design and control of a bioanode for CO<sub>2</sub> recovery in regenerative life support systems

| **Korneel Rabaey, University of Gent**

14:00 →

Application of the energy cascade model (MEC) on Lettuce crop grown in controlled environment at two different scales: A small growth chamber and a vertical farm.

| **Chiara Amitrano, University of Naples Federico II**

Microbial analysis of the MELISSA waste degradation compartment 1 (C1) and isolation and identification of C1 dominant bacteria

| **Tinh Van Nguyen, Division of Soil and Water Management, KU Leuven**

14:15 →

Modelling long-term continuous operation of the nitrifying Compartment in the MELISSA Pilot Plant

| **Laura Juvanteny, Autonomous University of Barcelona**

Improving ammonification to nitrate production in bioconversion of organic fertilizers to liquid products

| **Yankai Xie, University of Antwerp**

14:30 →

Global Control Loop of MELISSA Life Support System

| **Baptiste Boyer, SHERPA Engineering**

Plants in Space

| **Hristina Tsenova Kostadinova, High Language School "Ivan Vazov"**

14:45 →

Exploring the impact of irregular metabolic efficiencies and the space environment on the survivability of a regenerative life support system through agent-based modeling

| **Angelo Vermeulen, TUDelft**

Ecological Engineering of Photoorganoheterotrophic Mixed Cultures for Water Resource Factories

| **David Weissbrodt, TUDelft**

15:00 →

Coffee break

15:30 →

How ESA Business Applications can help commercialize MELISSA technologies

| **Nicolas Helssen, ESA Business Ambassador**

15:45 →

## Poster pitches

Membrane microgravity humidity separator - **Giuseppe Barbieri, CNR-ITM**

Modelling and testing of a root module irrigation unit - **Mario Palladino, ADepartment of Agricultural Sciences, University of Naples Federico II, Portici, Naples (Italy)**

Synthetic urine treatment by a defined bacterial consortium for urea hydrolysis, nitrification and COD removal in an up-flow packed bed reactor - **Marcel Vilaplana, UAB**

Cyanobacterial biomass production on Mars and Moon regolith and its utilization as a feedstock for other microorganisms and higher plants - **Tiago Ramalho, ZARM - Center of Applied Space Technology and Microgravity**

MELISSA in the space: safety and reliability issues - **Albert Tomas, SENER Aeroespacial, S.A.U.**

## Poster pitches

Soybean hydroponic crop production with human urine derived waste products - **Grace Margaret Crain, ETH Zurich Group of Plant Nutrition**

Producing ink from Organic Waste (OW-ink) for additive manufacturing in space - **Martin Cerff, Blue Horizon S.a.r.l.**

Waste Conversion Using Plasma and Thermal Degradation Systems for Space Applications - **Ray Pitts, NASA Kennedy Space Center**

Two-phase system for anaerobic digestion of corn extract for biohydrogen and biomethane production - **Venelin Hubenov, The Stephan Angeloff Institute of Microbiology**

Investigating volatile fatty acids conversion to CO<sub>2</sub> by the MELISSA bacterium *Rhodospirillum rubrum* in various culture conditions - **Felice Mastroleo, SCK-CEN**

## Food quality, processing and human nutrition

16:15 →

Impact of a closed life support system on human microbiome and health

| **Joël Doré, INRAE**

From a metabolic stoichiometry to a full MELISSA metabolome

| **Baptiste Leroy, UMONS**

16:45 →

SpaceBakery – a closed ecological plant cultivation system and bakery for extended stays on Planet Mars and their applications for Planet Earth.

| **Lucie Beckers, Puratos**

17:00 →

## Breakout discussion sessions

Space Architecture for a Moon Village - Life Support Elements

| **Daniel Inocente, SOM & Brigitte Lamaze, ESA**

17:15 →

Plant prebiotics in BLSS for human nutrition in space

| **Alberto Battistelli, Istituto di Ricerca degli Ecosistemi Terrestri (IRET) - Consiglio Nazionale delle Ricerche (CNR)**

17:30 →

Conclusion of the day (5min)

| **Christophe Lasseur, MELISSA Project**