

DATE : 5-9/02/2024

LOCATION: ROME; CASACCIA RESEARCH CENTER

ORGANIZED BY: ENEA DEPARTMENT OF SUSTAINABILITY



GREEN ECONOMY ACADEMY WINTER SCHOOL 2024
**“URBAN AND SPACE FARMING INNOVATIVE TECHNOLOGIES FOR A
MORE SUSTAINABLE AGRICULTURE”**

In collaboration with:



ORGANIZING COMMITTEE: OMBRETTA PRESENTI; GIOVANNA MARCIANI; GIACOMO SERAFINI

TOPICS

- SPACE FARMING OF PLANTS
 - BIOREGENERATIVE SYSTEMS
 - COSMIC ENVIRONMENT SIMULATION ON EARTH (COSMIC RAYS AND MICROGRAVITY);
 - CULTIVATION MODULES (EXAMPLES FROM MICROX2 AND SOLE ENEA PROJECTS AND KAYSER ITALIA AND ELTHUB CASE STUDIES);
- PLANT CELL FOOD
- 3D PRINTING INKS FOR (SPACE) FOOD APPLICATIONS;
 - FLOW CYTOMETRY FOR SPACE APPLICATIONS;
 - ANALOGUE MISSIONS: HORTEXTREME, AMADEE18, VGELM, LOOPSM, AMADEE24 AND BEATRICE PROJECTS



TOPICS

- URBAN FARMING
- HYDROPONIC CULTIVATION METHODS AND SYSTEMS;
- LED LIGHTS AND PLANT CULTIVATION (VERTICAL FARMING TECHNOLOGIES);
- IOT SYSTEM TO SUPPORT AND OPTIMIZE PLANT GROWTH AND DEVELOPMENT;
- NON-DESTRUCTIVE TECHNOLOGIES (FLUORIMETRIC, HYPERSPECTRAL, THERMOGRAPHIC AND 3D LASER SCANNER METHODS) TO ANALYSE PLANT HEALTH STATUS AND GROWTH
- 3D PRINTING FOR HYDROPONIC SYSTEM DEVELOPMENT AND OPTIMIZATION;
- CONTAINER FARMING: CHEF, MIG, IDROZAFF, MICROX2 PROJECTS AND ELTHUB CASE STUDIES; DOMESTIC AGRICULTURE (CULTIFUTURA PROJECT)



AGENDA

05/02/2024

- 8:15 Students' arrival

- 8:15 - 8:45 Research Center Access (passport required)

- 8:45 - 9:40 Institutional greetings and introduction to the topics of the winter school

[Biotechnologies and Agroindustry (BIOAG) Division Director M. Iannetta;; Biotechnology Laboratory (BIOTEC) Director G. Diretto; L. Nardi]

- 9:40 - 11:30 visit tour to the facilities and laboratories of the Research Center

(BIOTEC facilities; one of the two main national research reactors TRIGA-RC1; Calliope photon irradiation facility)

- 11:30 - 12:30 Lesson - Space plant ideotypes, In vitro and plant cell culture, Food 3D printing for urban and space applications

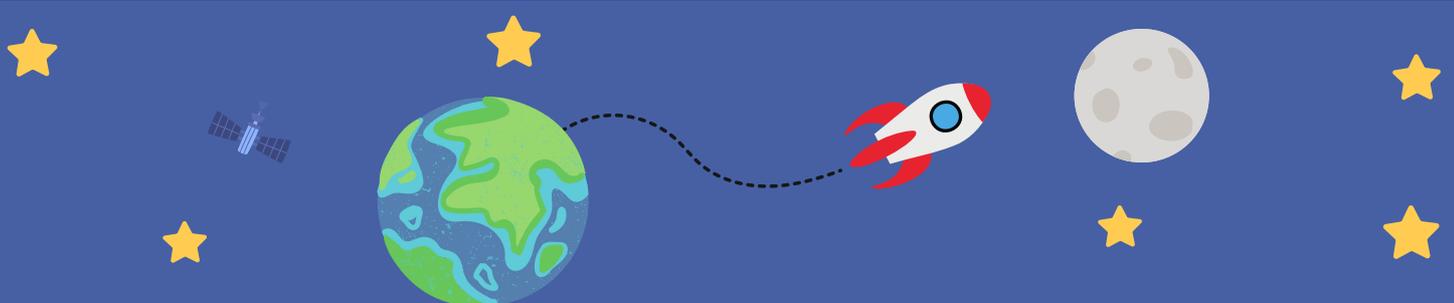
(S. Massa)

- 12:30 - 13:30 Lunch

- 13:30 - 15:30 Laboratory activities :Callus induction, liquid and solid subcultures, cellular viability, phytotrons visit

(S.Massa, R. Pagliarello; E. Bennici, V. Mastrobuono)

- 15:30 - 16:00 exit (bus shuttle to the hotel)



AGENDA

06/02/2024

- 8:15 Students arrival

- 9:00 - 10:00 Metabolomics approaches applied to agrifood systems

(G. Diretto)

- 10:00 - 11:00 Genetic Editing

(M. Tavazza)

- 11:00 - 12:00 Flow cytometry: single particle analysis applied to plant studies

(D.Giorgi)

- 12:00 - 13:00 Non-destructive technologies to analyse plant health status and growth

(M.E. Villani)

- 13:00 - 14:00 Lunch

- 14:00 - 16:00 Laboratory activities

Nuclei extraction from roots and cotyledons, cytometric analysis of plant samples, data analysis

(D. Giorgi, A. Farina, C. Sandri, B.Rinelli)

- 16:00 - 16:30 exit – bus shuttle to the hotel



AGENDA

07/02/2024

- 8:15 Students' arrival

- 8:30 - 10:00 Urban and Space Farming: Innovative Technologies for a more Sustainable Agriculture

(L. Nardi)

- 10:00 - 11:00 Hydroponics and hydroponic systems for plant cultivation

(C. Sandri)

-11:00 -11:40 Applications of hydroponic culture for abiotic stress detection

(M. Nava)

- 11:50 - 12:15 Demonstration of a hydroponic system for tomato

(E. Fabene)

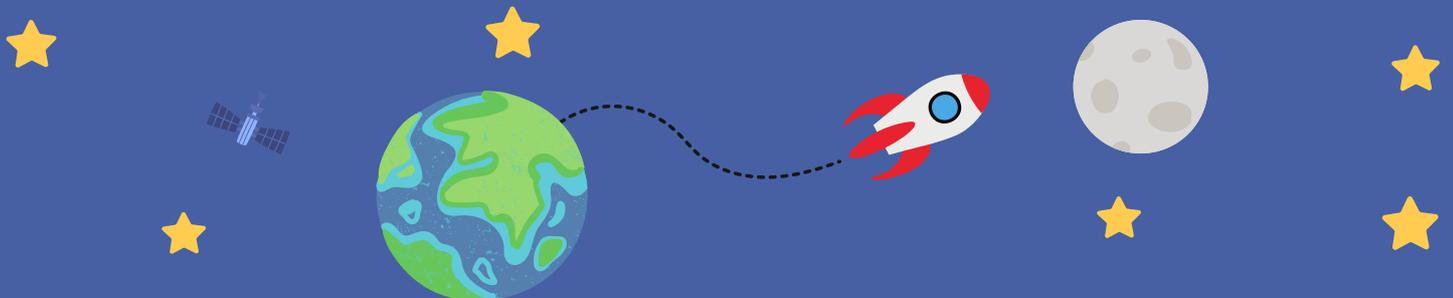
- 12:15 – 13:30 Lunch

- 13:30 - 14:30 Visit to the neutron laboratory of the National Institute of Ionizing Radiation Metrology (INMRI)

14:30-16:00 Laboratory activities: Hydroponic cultivation, controlled environment agriculture, Automation with Control and Management Systems, LED lights for plant cultivation and led light recipes, non-destructive analysis and morphometry, 3D printing for hydroponic system development and optimization).

(C. Sandri, E. Fabene, M. Nava, L. Nardi)

- 16:00 /16:30: exit – bus shuttle to the hotel



AGENDA

08/02/2024

Visit to Tuscia University



University of Tuscia, founded in Viterbo in 1979, rapidly developed into a well-established cultural reference. The choice of Viterbo as the location for the University is closely linked to the history and cultural traditions of the city, as well as the history of the complex of Santa Maria in Gradi. It appears that as early as the mid-13th century, there were itinerant schools in Viterbo where the disciplines of the trivium and quadrivium were taught.

AGENDA

09/02/2024



Visit University 'LA SAPIENZA' Dip.to DIAAE
and Laboratories of "Galileo Galilei" Institute



Sapienza is one of the oldest Italian universities, founded in 1303 by Pope Boniface VIII. In the seven centuries since its foundation, it has been at the centre of the history of Rome and the entire country; first as a university linked to the Popes, then as an autonomous Studium Urbis, gradually extending its academic prestige to new disciplines, both scientific and humanistic. Today Sapienza is a proper research university where you can research and study in all academic areas, placed among the top Italian universities in the main international rankings