



UNIVERSITÀ
DI TRENTO

Dipartimento di
Fisica

PHD PROGRAM IN SPACE SCIENCE AND TECHNOLOGY - SST

Lunar In-Situ Resource Utilization: Technologies, Processes and Engineering Challenges

November 9, 2026, 10.00 a.m.

Speaker:

Prof. Michèle Lavagna PhD - Full Professor of Flight Mechanics, Aerospace Science & Technology Department - Politecnico di Milano

Abstract:

The seminar provides an overview of Lunar In-Situ Resource Utilization (ISRU), outlining the nature and availability of lunar resources and discussing the main technological approaches for their extraction and exploitation and open challenges. A representative case study on lunar oxygen extraction, developed at Politecnico di Milano up to Technology Readiness Level 4 (TRL 4), will illustrate the engineering challenges and opportunities associated with advancing ISRU technologies toward future lunar applications.

Bio:

Michèle Lavagna is a Full Professor of Flight Mechanics at the Politecnico di Milano, Department of Aerospace Science and Technology, where she teaches space systems and missions design. She has been the principal investigator for over 50 competitively awarded research projects in collaboration with national and international space agencies, as well as major key players in the space sector. She leads the ASTRA research group and its 4 experimental laboratories. These include an ISO8 cleanroom for small satellite AIV/AIT, 2 GNC laboratories for image-based relative navigation testing, and a facility dedicated to water extraction from planetary regolith. She serves as a MUR (Ministry of University and Research) expert for Cluster 4 of Horizon Europe, Destination 5 - Space. Member of the Research and Innovation Forum of the Lombardy Region; member of the expert group for the Space and Aerospace Policy Office of the Presidency of the Council of Ministers (PCM); member of the Committee for the Development and Enhancement of Defense Culture. Former Roles: Former member of the HESAC-ESA advisory group for manned and unmanned space exploration; former space expert for the Ministry of University and Research; former member of the Scientific Committee of the Italian Space Agency (ASI). She conducted parabolic flight experiments funded by ESA to advance debris capture and removal techniques to TRL 5/6. Satellite Missions: Responsible for missions utilizing nanosatellites. Contributed to the LICIAcube/DART mission for asteroid impact protection. Scientifically leads the ASI/ORACLE project for oxygen extraction on the Moon and is actively involved in ESA/ASI experiments developing optical guidance systems for in-orbit servicing and lunar landing. She has authored 400+ scientific articles in peer-reviewed journals and conference proceedings. She has served as the advisor for 45 PhD theses in Aerospace Engineering and more than 200 Master's theses at the Politecnico di Milano.

Online attendance:

Information on remote participation can be requested by sending an e-mail to dn_sst@unitn.it