

Keynote on
“Sustainable design strategy and major aspects of planning and designing to enable Human Lunar Exploration”



Valentina Sumini, Ph.D

Valentina Sumini, Ph.D., is a space architect who offers computational design solutions supporting human life in extreme environments on Earth and facilitates human space exploration on the Moon and Mars. Valentina is Visiting Professor at Politecnico di Milano, where she teaches the course “Architecture for Human Space Exploration” and also created a collaborative classroom with the MIT Media Lab Webinar Series “Design Exploration: towards a Moon Architecture”.

Valentina research focuses on developing new computational design methods for multi-performance habitats, soft-robotic prosthetics to facilitate mobility and dexterity in microgravity, textile architecture, and advanced construction techniques using in-situ resources for a sustainable human space exploration.

Due to her in-depth studies at MIT Media Lab over several years, she developed various award-winning competition projects mostly organized by international Space Agencies. Valentina demonstrates her passion for enhancing human performance during deep space exploration missions through a range of projects; namely: a Space Hotel in Low Earth Orbit, a city on Mars and its generative design model, a greenhouse on Mars, an ice extraction system for Mars, a Moon Village, a soft robotic exoskeleton for enhancing astronaut movements in microgravity, and the multi-sensory Tidmarsh Living Observatory Portal to reconnect astronauts with nature during long-duration missions.

These space architecture projects have been presented in several international venues, including Beyond the Cradle at MIT Media Lab, EXPO Dubai 2020 and Biennale di Venezia 2021, Life Beyond Earth, with the Moon Village project in collaboration with European Space Agency and Skidmore, Owings and Merrill. Currently, she investigates new activities with high sustainability and innovation potential at COESIA Engineering Center.

Additionally, she is an active member of the AIAA Space Architecture Technical Committee and the American Society of Civil Engineers’ Earth and Space Technical Committee, to foster and democratize space architecture education across the world.