

Statement of Interest – Vice Chair, AIAA Space Architecture Technical Committee

My passion for space architecture began in 2009 when I designed Moorea, a lunar hotel concept to democratize access to space, for my Master thesis. Since then, I have continuously advanced research and design solutions to sustain human life in extreme environments on Earth and beyond. Over the years, I have contributed to award-winning projects supported by international space agencies, including a *Space Hotel* in LEO (NASA RASC-AL 2017), *Redwood Forest* and its generative habitat model *W.A.T.E.R.* (Mars City Design 2017), the *Marsboreal Greenhouse* (NASA Big Idea Challenge 2019), the *H.Y.D.R.A.* ice extraction system for Mars (NASA RASC-AL 2018), and the *Moon Village* in collaboration with ESA and SOM.

As a Postdoctoral Associate and later Research Affiliate at the MIT Media Lab and Space Exploration Initiative, I expanded these explorations into multidisciplinary research on computational design, in-situ resource utilization, XR/VR immersive tools, and human augmentation technologies, including wearable robotics tested in parabolic flight campaigns. My projects such as *SpaceSkin* and the *Tidmarsh Living Observatory Portal* explore novel strategies to enhance astronaut performance, resilience, and wellbeing in isolation and microgravity.

Since 2020, I have also served as Visiting Professor at Politecnico di Milano, where I created and teach the course Architecture for Human Space Exploration. Developed in collaboration with MIT, this program integrates computational design, XR/VR immersive technologies, and robotics to explore habitability in deep space. Through this role, I have mentored Bachelor, Master, and Ph.D. students, and fostered collaborative studios and webinars with MIT Media Lab and MIT Senseable City Lab, strengthening international education in space architecture.

I have also worked to disseminate space architecture to broader audiences. My projects have been exhibited internationally at the Venice Biennale (2021, 2024, 2025), MAXXI Technoscape in Rome, and the Cité des Sciences in Paris. At the 2025 Biennale, I presented *Design as an Astronaut*, an XR experience of a lunar habitat module (Argonaut Habitat Unit) deployed on top of the Argonaut Lander, developed in collaboration with ESA, MIT, and Politecnico di Milano. In 2025, I also launched a monthly column for Domus magazine dedicated to space architecture, bridging research and culture.

Within AIAA SATC, I serve as co-Chair of the Education Subcommittee and actively contributed to the Decadal Survey, extending this effort into education by engaging my space architecture students and colleagues. I also co-organized the Space Architecture Symposium 2024 at Politecnico di Milano, which enhanced the visibility of our community and created new opportunities for interdisciplinary collaboration.

As Vice Chair, I intend to:

- Expand international collaborations among academia, space agencies, and industry to reinforce SATC's global leadership.
- Mentor and empower young professionals, with inclusive initiatives to grow the next generation of space architects.
- Integrate advanced design tools (AI, XR) into SATC's knowledge base for learning activities, publications, and digital platforms.
- Strengthen outreach and visibility, leveraging exhibitions, editorials, and partnerships to highlight the societal and cultural significance of space architecture.
- Expand the domain of space architecture across both the aerospace and architectural sectors, ensuring it is recognized as a critical bridge discipline that shapes not only spacecraft and habitats but also the cultural and design paradigms of our time.

I believe this role is a unique opportunity to consolidate SATC's mission: uniting technical excellence with cultural vision to design humanity's future beyond Earth.

Sincerely,

Valentina Sumini