

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Medicine in Space and Extreme Environments (4)

Author: Dr. Susan Ip-jewell
Mars Academy USA, United States, marsacademyusa@gmail.com

Mr. Jay Velasco
Mars Academy USA, United States, marsacademyusa@gmail.com

Dr. Karan Ghatora
United Kingdom, k.ghatora@outlook.com

Ms. Morgan Kainu
Mars Academy USA, United States, marsacademyusa@gmail.com

Dr. Jesus A. Guerra-Rivera
Mars Academy USA, United States, marsacademyusa@gmail.com

Dr. Maria H
Mars Academy USA, United States, drmariaharney@gmail.com

SIMULATION-BASED TRAINING WITH EXPONENTIAL TECHNOLOGIES TO MAINTAIN
HEALTH AND WELLNESS FOR ANALOG ASTRONAUTS LIVING IN ICE AND VIABILITY IN
AUSTERE ENVIRONMENTS**Abstract**

INTRODUCTION: Space is hard for life. Space medicine, human factors and “astropsychosociological” risks and challenges must be addressed and solutions found integrating innovative concepts, new paradigms, and exponential technologies before humanity can realistically live and thrive in extreme environments to finally become a multi-planetary species. The recent successful onboarding of commercial space industries has increased the interest for human space exploration within the professional, academic and citizen scientist sectors resulting in increased funding and engagement in analog research, in particular, analog astronautics. This expansion has birthed a new type of astronaut mission that is becoming more common, available, and reliable to various communities, such as, Mars Academy USA (MAU) Mars Medics Missions (MMM), a unique scientific training program offered on a monthly basis in low fidelity Mars analogue scenarios. **METHOD:** The aim is to offer experiential simulation-based learning in a full immersive environment and to support selection of highly trained analog astronauts for MAU’s planned mid- and high-fidelity scientific Mars analogue missions in 2019-2020. Analog studies aim to test group cohesion, collaboration, communication and conflict-resolution strategies that might help predict team performance; establish baselines for a wide range of human cognitive, social and emotional factors; test viability of exponential technologies, such as VRAR and mixed reality, as novel tools in a multi-countermeasure program to mitigate or reduce stress and anxiety while living in I.C.E. Such studies can show how multi-disciplinary and international crews will perform on long-duration space exploration and missions to Mars and off-world settlements. **RESULT:** The data collected from the analog sims will assist scientists to recommend strategies for crew composition and determine how best to support such crews while they are living in Space. We will discuss the results obtained during multiple MAU sim missions and the feasibility of implementing integrative medicine modalities and innovative technologies, such as, Body Mapping Art in VR using the google tilt brush, meditationVR, Yoga and Tai Chi to address issues of stress, crew cohesion and test viability for mitigating anxiety and stress for the analog astronauts. **DISCUSSION:** Innovative, pioneering approaches incorporating exponential technologies will enable Humanity to not only survive but “thrive” in dangerous extreme environments on Earth, in Space and

future settlement on Mars. Additionally, potential to improve “state-of-the art” medical procedures and development of psycho-social countermeasures for training astronauts can be extrapolated for terrestrial “spin-off” benefits where challenges of Space can become accepted new paradigms on Earth.