



ASI-ITALIAN NAVY-ESA
Joint workshop
Isolation/confinement studies for human space
exploration

31 March-02 April 2025
Italian Space Agency-ASI
Via del Politecnico snc, Roma

Program at a glance

31 March		1 April		2 April	
		8:30-9:30	Registration	8:30-9:30	Registration
		10:00-10:30	Plenary lecture	9:30-10:00	Plenary lecture
				10:00-11:15	<i>Parallel Session 1</i> Human microbiome in ICE
		10:30-13:15	<i>Session 1</i> Physiological effects induced by isolation/confinement	11:45-12:30	<i>Parallel Session 2</i> Alteration of circadian rhythms
				12:30-13:30	<i>Parallel Session 3</i> Technologies for health monitoring, diagnosis, medical assistance and first aid in isolation/confinement
		13:15-14:30	Lunch	13:30-14:30	Lunch
13:00-14:00	Registration	14:30-15:00	Plenary lecture		
14:00-14:45	Institutional Greetings Key note: ASI				
14:45-17:15	Italian Navy ESA PNRA NASA	15:00-17:15	<i>Session 2</i> Psychological issue induced by isolation/confinement	14:30-17:00	<i>Session 5</i> Countermeasures to isolation/confinement
					<i>Parallel Session 4 (Room Cassini)</i> Habitat design and food production in ICE

Monday 31 March

13:00 - 14:00 Registration

Plenary Session (14:00-17:15)

14:00 - 14:15 ASI Institutional Greetings

Luca Vincenzo Maria Salamone, Director General - ASI

14:15 - 14:30 ESA Institutional Greetings

Ann-Kathrin Vlacil, Team Lead / Human Exploration Enabling Science - ESA

14:30 - 14:50 Presentation of the Italian Navy-ASI collaboration Agreement and analogies between Italian Navy missions and space missions

Barbara Negri, Head of Human Flight and Experimentation Office -ASI

14:50 - 15:10 Presentation of the Italian Submarines Service

Liutenant Commander Davide Gallo - Italian Navy General Staff - Head of Submarines Combat System Section

15:10 - 15:30 Presentation of the Special Forces and Divers Office

Captain Gianfranco Betrò - Deputy Head of Special Forces and Divers Office - Italian Navy General Staff

15:30 - 15:50 Presentation of the Navy Health Inspectorate

Liutenant Commander Alessandro Alcibiade - Italian Navy Neuropsychiatrist - Military Hospital Center of Taranto

15:50 - 16:10 ESA Human Research Science activities and Isolation/Confinement Studies

Melike Balk, HRE-HS Science Coordinator Support - ESA

16:10 - 16:30 National Research Antarctic Program: 40 years of Italian Research in Antarctica

Silvano Onofri, President of the Italian National Antarctic Scientific Commission

16:30 - 17:00 Presentation of NASA approaches for isolation/confinement studies and ongoing activities

Alexandra M. Whitmire, Human Factors and Behavioral Performance - NASA Human Research Program

Ajit Mulavara, Human Factors and Behavioral Performance - NASA Human Research Program

Tuesday 01 April

08:30 - 09:30 Registration

Plenary session

10:00 - 10:30 Submarine Exposome to understand the Space Exposome

Monica Monici - ASAcampus Joint Laboratory, ASA Research Division & Dept. of Experimental and Clinical Biomedical Sciences "Mario Serio", University of Florence

Session 1 - Physiological effects induced by isolation/confinement (10:30-13:15)

Chair: Serena Perilli, Francesca Ferranti

10:30 - 10:45 SubSea – ESA Isolation Standard Measures during Submarine missions

Inês Antunes – ESA

10:45 - 11:00 Effect of social ISoLation on autonomic Nervous system, cardiovascular and immune systems, sleep, psychological status and cognitive performances: the ISLAND study

Angelica Carandina - Dept. of Clinical Sciences and Community Health, University of Milan

11:00 - 11:15 Oxidative stress and inflammatory markers in astronauts and submariners: what happens during short and long term missions

Lucia Morbidelli - Dept. of Life Sciences, University of Siena

11:15 - 11:30 Effects of extreme environments mitochondrial function and cell energy metabolism. A Comparison of Astronauts and Submariners

Francesca Cialdai - ASAcampus Joint Laboratory, ASA Research Division & Dept. of Experimental and Clinical Biomedical Sciences "Mario Serio", University of Florence

11:30 - 12:00 Coffee break

12:00 - 12:15 Cytokines' profile: understanding the role of sterile inflammation in astronauts and submariners

Giulia Nannini - Dept. of Experimental and Clinical Medicine, University of Florence

12:15 - 12:30 NEPTUNE Insights: Clustering Approach for Anomaly Detection in Submariner Health Profiles

Andrea Rozo - CREST – ATM Université libre de Bruxelles

12:30 - 12:45 Investigating the impact of spaceflight on the peripheral blood mononuclear cell transcriptome and circulating miRNome: a comparative analysis in astronauts and submariners

Matteo Lulli - Dept. of Experimental and Clinical Biomedical Sciences "Mario Serio", University of Florence

12:45 - 13:00 Cardiometabolic hormone changes in subjects undergoing isolation and confinement: studies in submarine and spaceflight missions

Paolo Magni - Dept. of Pharmacological and Biomolecular Sciences, University of Milan, IRCCS MultiMedica

13:00 - 13:15 **Erythrocyte membrane composition and antioxidant potential in response to isolation missions in submarines and real space flight**
Angela Maria Rizzo - Dept. of Pharmacological and biomolecular sciences, University of Milan

13:15 - 14:30 **Lunch Break**

Plenary Session

14:30 - 15:00 **Consequences of longterm-Confinement and Hypoxia on Immunity in the Antarctic Environment: the CHOICE protocols**

Alexander Chouker, Hospital of the University of Munich (LMU)

Session 2 - Psychological issue induced by isolation/confinement (15:00-17:15)

Chair: Inês Antunes, Serena Pezzilli

15:00 - 15:15 **A quick mindfulness training for an isolated and confined environment (MINDFUL-ICE II)**

Francesco Pagnini - Dept. of Psychology, Università Cattolica del Sacro Cuore, Milan, Italy

15:15 - 15:30 **Crew mental health and teamwork dynamics during a one-week lunar analogue mission in a lava tube**

Pedro Quinteiro-Marques - Universidade Lusófona, Lisboa, Portugal

15:30 - 15:45 **Coffee Break**

15:45 - 16:00 **Optimise Behavioural Health and Human Factors Research for Deep Space Missions by Classifying Analogue Scenarios and Fidelity**

Ilaria Cinelli - Aerospace Medical Association

16:00 - 16:15 **Insights and future directions from systematic investigation of decision-making processes in isolated and confined environments**

Pierpaolo Zivi - Dept. of Psychology, Sapienza University of Rome

16:15 - 16:30 **Fluctuation and correlates of emotional functioning in isolation and confinement. A two-year study project in an analog space habitat**

Mateusz Paliga - Institute of Psychology, University of Silesia in Katowice

16:30 - 16:45 **Solo sailing as potential analog to investigate psychological effects of ICE environments: a single case study from the Global Solo Challenge**

Claudio Zavattaro - Dept. of Psychology, University of Turin

16:45 - 17:00 **Social and Psychological Challenges of Long-Term Space Missions: A Paradigm of a new Space Society**

Tommaso Galeotto - Business Integration Partners SpA

17:00 - 17:15 **Cognitive and physical fatigue induced by military operations in hypoxic and cold environment**

Sara Spinabelli - Dept. for Life Quality Studies, University of Bologna

Wednesday 02 April

08:30 - 09:30 Registration

Plenary session

09:30 - 10:00 A year on White Mars: research at – 80 °C

Carmen Possnig - MD and member of the ESA Astronaut Reserve

Parallel Session 1 - Human microbiome in ICE (10:00-11:15) - Room Auditorium

Chair: Claudia Pacelli, Micol Bellucci

10:00 - 10:15 A One Health approach to support human life in confined space environments

Francesco Canganella - DIBAF, University of Tuscia

10:15 - 10:30 The impact of hypobaric hypoxia and confinement stress on the gut proteome and microbiome results from the choice study

Dominique Moser - Laboratory of Translational Medicine “Stress and Immunity”, Hospital of the University of Munich (LMU)

10:30 - 10:45 Microbiota dynamics in confined environments: a comparative study of long-term and short-term submarine missions

Massimiliano Marvasi - Dept. of Biology, University of Florence

10:45 - 11:00 Yeast extracellular vesicles as a tool in maintaining a healthy skin microbiome

Duccio Cavalieri - Dept. of Biology, University of Florence

11:00 - 11:15 Synthetic peptides with antibacterial activity for space stations

Teresa Rinaldi - Dept. of Biology and Biotechnologies, Sapienza University of Rome

11:15 - 11:45 Coffee Break

Parallel Session 2 – Alteration of circadian rhythms (11:45-12:30) - Room Auditorium

Chair: Alessia Cassaro, Sara Piccirillo

11:45 - 12:00 Long term non-invasive assessment of cardiac electro-mechanical adaptation to isolation and confinement: highlights from lunar analog missions

Sara Solbiati - Dept. of Electronics, Information, and Bioengineering, Politecnico of Milan

12:00 - 12:15 Dynamic analysis of the effect of isolation on circadian rhythms and their associations with cognitive, emotional and physiological responses: a concept for the IsoRhythm study

Monica Patrascu - Dept. of Clinical Psychology, University of Bergen

12:15 - 12:30 How Sleep Research in Extreme Environments Can Inform Space Exploration: Advocating for a Transactional Model of Sleep Adaptation

Nathalie Pattyn - VIPER Research Unit, Royal Military Academy

Parallel Session 3 – Technologies for health monitoring, diagnosis, medical assistance and first aid in isolation/confinement (12:30-13:30) - Room Auditorium

Chair: Silvia Mari, Luca Parca

12:30 - 12:45 STARC: Simulation-based Training and teamwoRk Assessment for confined and isolated Contexts

Gianluca Borghini - Dept. of Molecular Medicine, Sapienza University of Rome

12:45 - 13:00 The Role of Nursing Teleconsultation in Space Missions: Ensuring Health and Well-Being

Claudio Morelli - IRCCS Istituto Tumori Giovanni Paolo II

13:00 - 13:15 Wearable biosensors for monitoring stress biomarkers

Leonardo Messina - Microsis s.r.l.

13:15 - 13:30 Automated Digital Assessment of Language Use for Monitoring Mood and Anxiety Disorders

Chiara Barattieri Di San Pietro - IUSS Pavia

Parallel Session 4 – Habitat design and food production in ICE (10:15-13:30) - Room Cassini

Chair: Ann-Kathrin Vlacil, Marta Del Bianco

10:15- 10:45 Sensory Design For Confined Habitats

Invited speaker: Benedetto Quaquaro, Dept. of Design, Politecnico of Milan

10:45 - 11:00 Thermo-economic Analysis of confined habitats, by ARHS software

Evandros Theodosiou - Independent Researcher

11:00 - 11:15 Synthesizing analog mission design and communication latency technology

Rob Brougham - Braided Communications Ltd

11:15 - 11:45 Coffee Break

11:45 - 12:00 Optimized Growing Media for Space Agriculture: A Computational Approach

Simona Perotto - Dept. of Mathematics, Politecnico of Milan

12:00 - 12:15 Space greenhouses to help astronauts ease their sense of confinement and isolation

Giorgia Pontetti - G&A Engineering S.r.l.

12:15 - 12:30 Antarctica as an analog test site for space crop production systems development: the EDEN ISS experience

Giorgio Boscheri - TAS-I

12:30 - 12:45 Speleology confined environment testing of exploration mission system prototypes: the BEATRICE and GEA projects at Sapienza S5Lab

Paolo Marzioli - Dept. of Mechanical and Aerospace Engineering, Sapienza University of Rome

12:45 - 13:00 Innovative Greenhouse Design for Space: Optimizing Growth, Energy, and Psychological Benefits

Franco Malerba - Space V

13:00 - 13:15 The role of plant cultivation in confined environments: enhancing psychological well-being, air quality, and nutritional health

Veronica De Micco, Stefanica De Pascale - Dept. of Agricultural Sciences, University of Naples Federico II

13:15 - 13:30 Microgreens for “Concordia”

Luca Nardi - ENEA SSPT

13:30 - 14:30 Lunch Break

Session 5 – Countermeasures to isolation/confinement (14:30-17:00)

Chair: Melike Balk, Luca Di Fino

- 14:30 - 14:45 The Role of High-Quality Food and Natural Additives in Supporting Individuals in Confined and Isolated Environments: Insights from Long-Term Research and Italian Culinary Expertise**
Giulia Lorusso - Sudalimenta
- 14:45 - 15:00 Prebiotic-Rich Plant Cultivation for Space-Based Nutrition and Microbiome Support**
Simona Proietti - CNR IRET
- 15:00 - 15:15 Countermeasures for Space Exposome: Nutritional Strategies to Mitigate Isolation and Confinement Stressors**
Sofia Pavanello - Dept. of Cardiac, Thoracic, Vascular and Public Health Sciences, University of Padua
- 15:15 - 15:30 Exploring the Relationship Between Mood and Voluntary Food Intake in Isolated Environments**
Christina-Ariadni Valagkouti - German Aerospace Center, Institute of Aerospace Medicine
- 15:30 - 16:00 Coffee break**
- 16:00 - 16:15 Enhancing Astronaut Well-being Through Shared Meals: Exploring the Role of Conviviality in Space Missions**
Valeria Rapetti - Barilla
- 16:15 - 16:30 VIET TAI CHI FOR ASTRONAUTS: the practice of VTC in the psycho-physical training of space crews – Guidelines.**
Anna Campo - ASD Thien Mon, Padova
- 16:30 - 16:45 Brain Changes, Cognitive Performance and Their Molecular Signatures in Response to a Combined Exercise and Sensory Stimulation Countermeasure During Long-Duration Antarctic Winter-Over Missions**
Alexander C. Stahn - Institute of Physiology, Charité University Medicine Berlin
- 16:45 - 17:00 From Antarctica to Alzheimers – exercise helps to prevent cognitive decline**
Stefan Schneider - German Sport University Cologne