




مركز محمد بن راشد  
للقضاء  
MOHAMMED BIN RASHID SPACE CENTRE


## General Overview of the Program

### ISGP 2024 in Dubai










مركز محمد بن راشد  
للقضاء  
MOHAMMED BIN RASHID SPACE CENTRE



دبي الصحية  
DUBAI HEALTH  
جامعة محمد بن راشد  
للعلوم الطبية والصحية  
Mohammed Bin Rashid University  
of Medicine and Health Sciences



The International Society for Gravitational Physiology is inviting you to the

## 43<sup>rd</sup> Annual ISGP Meeting in Dubai

May 26<sup>th</sup> to 31<sup>st</sup>, 2024



Venue: Mohammed Bin Rashid University of Medicine and Health Sciences

Sunday, May 26th	Monday, May 27th	Tuesday, May 28th	Wednesday, May 29th	Thursday, May 30th	Friday, May 31st
09:00	Opening Ceremony (9:00 - 9h30)				
09:30	Plenary 1 - CURRENT CONCEPTS <i>Alamelu Sundaresan "The Lunar Challenge- Lunar dust and the human being in moon missions"</i> <i>Asa Berggreen "Insects as food for space travel and planetary colonisations"</i>	Plenary 2 Session dedicated to MBRSC (9:00 - 11:00)	Plenary 3 <i>Rodents in Altered Gravity: Advances in Space Biology Research</i> (9:00 - 11:00)	Coffee break available	
10:00				Plenary 4 <i>LBNP as countermeasure</i> (10:00 - 12:00)	
10:30	Coffee break	Coffee break	Coffee break		
11:00					
11:30	Young Investigators Session (1) 11:30 - 12:30	Young Investigators Session (2) 11:30 - 12:30	Young Investigators Session (3) 11:30 - 12:30		
12:00					
12:30	Lunch Break	Lunch Break	Lunch Break	Lunch Break	
13:00	Lunch & Poster (13:00 - 14:00)	Lunch & Poster (13:00 - 14:00)			
13:30			Institutional session (1) 14:00 - 15:00	Institutional session (2) 13:30 - 15:00	Friday tour
14:00	Moon Exploration (14h:00-15h30)	Studies with gender differences (14h:00-15h30)	Muscle and movements (14h:00-15h30)	Medical issues for exploration (14h:00-15h30)	
14:30			VIVALDI dry immersion study (15h:00-16h30)	Animal Models (15h:00-16h30)	
15:00				Closing Ceremony (15:00 - 15:30)	
15:30					
16:00					
16:30	Space Exploration and extreme environments (16h:30-18h00)	Cells and plants (16h:30-18h00)	SIRIUS Isolation study (16h:30-18h00)	Cardiovascular system (16h:30-18h00)	
17:00	Immunology and inflammation (17h:00-18h00)	Hypergravity (17h:00-18h00)		ISGP General Assembly (16:00 - 17:30)	
17:30	Welcome of participants for registration				
18:00					
18:30					
19:00	Welcome party (18:30 - 21:30)	Young Investigator event : Ghawa & Career (18:30 - 20:30)			
19:30			Gala Dinner & Young Investigators Award Ceremony (19:30 - 22:00)		



Monday, May 27<sup>th</sup>

## Opening Ceremony

### Plenary 1 - Current Concepts (9:30 – 11:00)

Chaired by Alexander Choukér & Marc-Antoine Custaud

#### **Alamelu Sundaresan**

*The Lunar Challenge- Lunar dust and the human being in moon missions*

#### **Asa Berggeen**

& co-authors : Annette Bruun Jensen, David Copplestone, Roberto Guidetti, Martina Heer, Paola Pittia  
*Insects as food for space travel and planetary colonisations*

### Young Investigator session – 1 (11:30 – 12:30)

Chaired by Anna-Maria Liphardt & Sami Al Ghayath

#### **Ahmed Bakri**

*The impact of Microgravity on Experimental Periodontitis: An In Vivo Study (p. 1)*

#### **Damien Lanéelle**

*Orthostatic tolerance according to cerebral arterial pattern variations during hemodynamic stress combining lower body negative pressure and head-up-Tilt (p.4)*

#### **Victorien Faivre-Rampant**

*Does gravity affect intrinsic cardiac function? Effects of different gravitational loads on the cardiac performance independent of the preload (p.6)*

#### **D.A. Sidorenko**

*The ryanodine receptor stabilizer S107 prevented the increase in fatigue and the decrease in strength of rat soleus muscle after simulated gravitational unloading (p.8)*

### Parallel Session (a) “Moon Exploration” (14:00 – 15h30)

Chaired by Alamelu Sundaresan & Jay Bookbinder (tbc)

#### **Salma Subhi**

*Chondrites: Understanding the Origins of the Solar System (p.10)*

#### **Chiara Pucciariello**

*The REGOLIFE project: Bio-Engineering Lunar Regolith for Moon Crop Cultivation (p.12)*

#### **Jay Bookbinder**

*SpinSat: a Novel Mission Architecture for Deep Space Radiation and Gravitational Studies (p.14)*

#### **Shannon Marchal**

*Research into “Lunar Hay Fever” on Earth – Finding Answers in an in Vitro Airway Model? (p.15)*

#### **Fawzan Mohamed Kareem Navaz**

*Utilizing bio-inspired hierarchical multi-shell structures (BHMSS) for radiation shielding in space exploration (p.17)*

## Parallel Session (a) “Studies with gender differences” (14:00 – 15h30)

Chaired by Vishwajeet Shankhwar & Mennatullah Khalil

**Kunihiko Tanaka**

*Galvanic Vestibular Stimulation Decreases Parathyroid Hormone in Menopausal Women (p.18)*

**Ivan Vasilev**

*Parameters Of Venous Hemodynamics In Female Volunteers During Their Stay In A 5-day “Dry” Immersion (p.19)*

**Galina Vassilieva**

*Five-day “Dry” Immersion With Female Subjects (“Immersion-5F-LF”): Main Objectives And Results (p.21)*

## Parallel Session (b) “Space exploration and extreme environment” (16:30 – 18h00)

Chaired by Alain Maillet & Noora Al Mheiri

**Yasmin Halawani**

*AstroBEAT: Cardiovascular Variability Analysis and Lunar Microgravity Twin (p.23)*

**Monica Monici**

*Mechanisms of Adaptation to Extreme Environments The Exposome Signature Project (p.25)*

**Elena Fomina**

*Methods for the prevention of monotony in interplanetary spaceflight (p.27)*

**Leonardo Surdo**

*Crew-interactive AI-powered Health Applications via the ICE Cubes Media Set (p.29)*

**Judith-Irina Buchheim**

*Support of a Crew Activity with the Crew Interactive Mobile Companion (CIMON) (p.31)*

**Sandeep Sureh Babu**

*Potential of Bioprinting in Space Missions: Challenges on the way forward (p.33)*

## Parallel Session (b) “Cells and plants” (16:30 – 18h00)

Chaired by Mohamed Jamal & Jack van Loon

**Mahamed Ashiq**

*Hypergravity Confers Abiotic Stress Tolerance In Bread Wheat (*Triticum aestivum* L.) (p.36)*

**Irina Ogneva**

*The *Drosophila Melanogaster* Oocytes Demonstrate The Mechanoreception Under Short-Term Modelling Micro- and Hypergravity (p.38)*

**Devjoy Dev**

*The effect of short-term exposure to simulated microgravity on circadian clock gene expression in mouse embryonic fibroblasts (p.40)*

**Mohamed Jamal**

*Oral tissues and neural crest derived stem cells as a model to study oral health in microgravity environment (p.41)*

**Osman Patel**

*Impact of microgravity exposure on genes regulating cell turnover in rat mammary gland (p.42)*

**Mauro Maccarrone**

*Simulated Microgravity Affects Specialized Pro-Resolving Mediators and Human Inflammatory Homeostasis in a Cell-Specific Manner (p.43)*

Tuesday, May 28<sup>th</sup>

## Plenary 2 - Session dedicated to MBRSC (9:00 – 11:00)

Chaired by Angelique Van Ombergen & Noora Al Mheiri

**Fatma Lootah**

*Overview of Mohammed Bin Rashid Space Centre –*

**Astro. Sultan Al Neyadi**

*Overview of Astronaut Sultan Al Neyadi's Long Duration Mission to ISS –*

**Saif Al Qassim**

*Protein Crystal Growth / Presentation #1*

**David Sheehan**

*Protein Crystal Growth / Presentation #2*

## Young Investigator session – 2 (11:30 – 12:30)

Chaired by Angelique van Ohmbergen & Youssef Elsabban

**Zeinab Ibrahim**

*Exploring Novel Therapeutics Targets Against Cardiovascular and Skeletal Muscle Deconditioning in Hindlimb Unloading Model (p.45)*

**E. Yu. Gorbacheva**

*The Ovarian-Pituitary Axis Of Mice After Antiorthostatic Suspension During The Full Estrous Cycle (p.47)*

**Ines Ebner**

*Changes in physical activity levels during 60-days of 6°head-down-tilt bed rest - a preliminary data analysis of the BRACE study (p.49)*

**T.J. Pereira**

*Does an N95 mask improve Orthostatic Tolerance? (p.51)*

## Parallel Session (a) “Muscle and movements” (14:00 – 15h30)

Chaired by Anna-Maria Liphardt & Elena Tomilovskaya

**Elena Tomilovskaya**

*Perspectives of electromyostimulation approaches for muscle strength and endurance maintenance under motor unloading conditions: from Space to Earth (p.53)*

**Ivan Ponomarev**

*Effect of 7-day course of electromyostimulation on the contractile and viscoelastic properties of the muscles of the lower extremities under conditions of support unloading (p.54)*

**Karolina Almeida Borges**

*Space Tourism- MyotonPRO experiment on Muscle Tone (p.56)*

**Tatiana Shigueva**

*Effects of Electromyostimulation on Characteristics of Reflex Excitability of Calf Extensor Muscles Under Dry Immersion Conditions (p.59)*

**Nelly Abu Sheli**

*Maximal Voluntary Muscle Force And Muscle Tone Of The Lower Extremities In Patients With Chronic Cerebrovascular Insufficiency And Deficit Of Physical Activity After A Course Of Modulated Electrical Myostimulation (“Russian Currents”) (p.61)*

**Anna Ganicheva**

*The Role Of Spaceflight Experience And Mission Duration In The Success Of Completing Model Tasks On The Planet Surface (p.63)*

## Parallel Session (b) “Medical issues for exploration” (14:00 – 15h30)

Chaired by Ilya Rukavishnikov & Monica Monici

### **Monica Monici**

*Wound Healing and Tissue Regeneration in Space The SUTURE in SPACE Experiment (p.65)*

### **Elias A**

*Risk of Thromboembolism in Space: Current Evidence and Perspectives (p.67)*

### **Ilya Rukavishnikov**

*Analysis Of The Possibility Of Using Ground-Based Space Flight Models In Studying The Effects Of Stress, Accompanied By A Decrease In Motor Activity Of Various Duration, On Hemostasis Parameters And The State Of The Human Vascular Bed (p.69)*

### **Philippe Arbeille**

*Liver tissue changes during 6-month space flight measured by ultrasound RF signal processing (p.70)*

## Parallel Session (a) “SIRIUS & Isolation studies” (16:30 – 18h00)

Chaired by Elena Fomina & Shaikha Al Falasi

### **Tatiana Agaptseva**

*Evaluation of individualized physical training protocols in experiments SIRIUS-21 and SIRIUS-23 (p.71)*

### **Nandu Goswami**

*Effects of Prolonged Isolation on Human Health: From Ground-based Analogs to Spaceflight Environments (p.73)*

### **Asma Parveen**

*Effects of an 8-months isolation on Body Composition and Cardiopulmonary Exercise Testing (p.75)*

### **Carine Platat**

*Body composition and glucose homeostasis during a 8-month ground-based isolation study (p.78)*

### **Stefan Du Plessis**

*Effects of Isolation on Cardiovascular and Autonomic systems (p.80)*

## Parallel Session (b) “Cardiovascular system” (16:30 – 18h00)

Chaired by Victoria Ly & Jacques-Olivier Fortrat

### **Andrew Blaber**

*Altered Cardiorespiratory Interactions with Spaceflight: Preliminary Results from CARDIOBREATH (p.81)*

### **Carmen Possnig**

*Understanding mechanisms and unveiling countermeasures for the bedrest- induced decrease in cerebral blood flow: Preliminary data (p.83)*

### **Adrien Robin**

*Gravitational dose-response curves for cardiovascular and ocular variables after 24h bedrest or drug-induced hypovolemia (p.85)*

### **Jacques-Olivier Fortrat**

*Self-organized criticality of Heart rate variability During Actual and Simulated Weightlessness: insights from Lower Body Negative Pressure (p.87)*

### **Olga Vinogradova**

*Synchronization Of Blood Pressure And Heart Rate Oscillations In Different Frequency Ranges As A Measure Of Disturbances In The Regulation Of Systemic Hemodynamics During Tilt Test (p.89)*

**Wednesday, May 29<sup>th</sup>**

**Plenary 3 - Rodents in altered gravity: Advances in Space Biology Research (9:00 – 11:00)**

Chaired by Sara Tavella & Jack van Loon

**Alexander Andreev-Andrievskiy**

*Sex differences in vasopressin regulation of water-salt metabolism in hindlimb unloaded mice (p.173)*

**Sara Tavella**

*Adaptation to 3g Hypergravity: A Multidisciplinary Tissue Sharing Program from a 27-Day Mouse Experiment (p.175)*

**Daniela Santucci**

*Effect of 27 day-3g-exposure in C57BL/6J adult male mice: behavioural and neurobiological analysis*

**Young Investigator session – 3 (11:30 – 12:30)**

Chaired by Marc-Antoine Custaud & Alya Alowais

**Victoria Ly**

*Self-Generated Lower Body Negative Pressure Exercise, a Low Power Countermeasure for Deep-Space Missions (p.90)*

**Zhiyao Ma**

*Exploring the Impact of Simulated Microgravity on Osteoarthritis Development: The Role of CD36 and Sex-Specific Responses in a Mouse Model (p.92)*

**Constance Badali**

*SpaceBike – Preliminary Insights into Neuromuscular Adaptation through Bed Rest (p.94)*

**R. Yu. Zhedyaev**

*Direct Comparison of Head-Down Bed Rest and Dry Immersion Effects on Human Cardiac Baroreflex During Orthostatic Stress (p.96)*

**Plenary session “Institutional session - 1” (14:00 – 15h00)**

*During this session, a presentation of roadmaps and perspectives on life sciences in space will be presented by a panel of representatives from academic institutions and space agencies.*

**Parallel Session (a) “VIVALDI dry immersion study” (15:00 – 16h30)**

Chaired by Rebecca Billette de Villemeur & Nastassia Navasiolava

**Rebecca Billette de Villemeur**

*Of The Dry Immersion Model For ESA: Description Of The VIVALDI I And II Studies (p.98)*

**RK. Vergos**

*VIVALDI I And II: General Tolerance To 5 Days Of Dry Immersion In 38 Healthy Men And Women (p.100)*

**Nastassia Navasiolava**

*Dry immersion effects on circadian rhythms and day-night variability of core temperature, heart rate, and blood pressure (p.102)*

**Peter Fernandez**

*Exploring Bone Adaptation and Energy Metabolism Between Males and Females Under Dry Immersion Conditions (p.103)*

**Adrien Robin**

*Venous functions and leg volume changes during the two ESA Vivaldi dry-immersion studies in men and women (p.105)*

**Marc Kermorgant**

*Gender Related Differences On Dry Immersion-Induced Ophthalmological Changes (p.107)*



## Parallel Session (b) “Immunology and inflammation” (17:00 – 18h00)

Chaired by & Jean-Pol Fripiat & Alexander Choukér

### **Pauline Jacob**

*Hindlimb unloading, a physiological model of microgravity, modifies the murine bone marrow IgM repertoire in a similar manner as aging but less strongly (p.109)*

### **Mei ElGindi**

*Effects of Simulated Microgravity on Immune System Potency in 3D Microenvironment (p.111)*

**Panel discussion on that topic**

## Parallel Session (a) “Animal models” (15:00 – 16h30)

Chaired by Alexander Andriev-Andrievsky & Angela Maria Rizzo

### **Theo Fovet**

*The NEBULA Project: Effect Of Pre-Flight Physical Training On Bone And Muscle In A Mouse Microgravity Analog Model (p.112)*

### **Jack J.W.A. van Loon**

*Fetal mouse long bones under continuous microgravity or in-flight periods of 1×g centrifugation as countermeasure (p.114)*

### **Timur Mirzoev**

*Spinal mechanisms triggering the spontaneous tonic activity of the postural soleus muscle under hindlimb unloading (p.116)*

### **Ameneh Ghadiri**

*Femurs of Mice Exposed to Hypergravity Show Deregulation of Genes Mainly Associated with ECM-receptor Interactions and Protein Digestion and Absorption (p.117)*

### **Angela Maria Rizzo**

*Hypergravity Exposure Induces Alterations Of Erythrocyte Membrane And Antioxidant Potential Of Mice Housed In The MDS Facility (p.119)*

## Parallel Session (b) “Hypergravity” (17:00 – 18h00)

Chaired by Ines Ebner & Maryam Almarzooqi

### **Rebecca Billette de Villemeur**

*A 60-Day Bed Rest With Artificial Gravity And Cycling Exercise: The BRACE Study – Description Of The Study Method (p.120)*

### **Jan Millek**

*Does Artificial Gravity Tolerance Change Across seasons? (p.122)*

### **Maryam Almarzooqi**

*Comprehensive exploration of artificial gravity solutions for optimizing long-term space exploration missions (p.123)*

### **Alina Saveko**

*Effect of different short-radius centrifugation interval training modes on vertical stability (p.126)*

Thursday, May 29<sup>th</sup>

### Plenary 4- LBNP as countermeasure (10:00 – 12:00)

Chaired by Nandu Goswami & Andrew Blaber

**Nandu Goswami**

*Physiological effects of LBNP (p.177)*

**Andrew Blaber**

*Role of the calf pooling in blood pressure regulation*

**Asrar Abdi**

*Effects of Menstrual Cycle on Hemodynamic and Autonomic Responses to Central Hypovolemia (p.178)*

**Vishwajeet Shankwar**

*Does Gender Influence Cardiovascular and Autonomic Responses to Central Hypovolemia? (p.179)*

### Plenary session “Institutional session - 2” (13:30 – 15h00)

Chaired by Ines Antunes & Cyndi Roman

**Pierre Denise**

*SPACEMED Erasmus Mundus Joint MSc: The first European Master’s program in Physiology and Medicine of Humans in Space and Extreme Environments (p.128)*

**Angelique Van Ombergen**

*ESA’s Human Exploration Enabling Science Activities: recent highlights, where are we going and how can you get involved? (p.130)*

**Pauline Jacob**

*Gravitational Experimental Platform for Animal Models, a New Platform at ESA’s Terrestrial Facilities to Study the Effects of Micro- and Hypergravity on Aquatic and Rodent Animal Models (p.131)*

**Neil Melville**

*ESA’s Parabolic Flight Activities: An overview of our campaigns, capabilities, and new application routes for Technological and Commercial proposals (p.133)*

**Marisa Covington**

*Navigating the NASA IRB and human research multilateral review board (HRMRB): an ethics perspective (p.134)*

**Cyndi Roman**

*ClinicalTrials.gov: Understanding the Clinical Trials Requirements at NASA (p.135)*

### Closing ceremony and announcement of our next meeting in 2025



**Posters Session**

*Poster will be available during all the meeting.  
Authors are kindly requested to be present during their session*

**Posters presented during the session on Monday**

Chaired by Noora Al Mheiri & Nastassia Navasiolava

**1 - Tatiana Kostrominova**

*Role of Inositol-trisphosphate Receptors in the Regulation of Signaling Pathways During Unloading-induced Rat Soleus Muscle Atrophy (p.136)*

**2 - Monica Christova**

*Activating Orthostatic Response with Motor Imagery: Potential Application in Returning Astronauts and Older Adults (p.139)*

**3 - Amira Sayed Khan**

*Novel GPR120 agonist modulates systemic and neuroinflammation (p.141)*

**4 - Aya Hesham**

*Space-Fit Far Infrared Suit for Back Pain Mitigation onboard the International Space Station (ISS) (p.142)*

**5 - Alexandru Nistorescu**

*Assessing Achilles Tendon Mechanics With MusTone Device: A Myotonometric Approach To Understanding Tissue Dynamics (p.144)*

**6 - Abdulrahman Alblooshi**

*Exploring the Therapeutic Potential of Gravitational Psychology in Disease Understanding (p.146)*

**7 - Pauline Jacob**

*Long-duration head-down tilt bed rest confirms the relevance of the neutrophil to lymphocyte ratio and suggests coupling it with the platelet to lymphocyte ratio to monitor the immune health of astronauts (p.148)*

**8 - Adel Elmoselhi**

*Effects of Isolation and Confinement on Vascular Health during Space Travel: Insights from a SIRIUS-21 Analog Mission (p.150)*

**9 - Andreas Rössler**

*Effects of hemodynamic responses during stand test following 15 minutes of sinusoidal vibration of varying intensity (p.152)*

**10 - Masahiro Terada**

*Performing the bedrest study for the space medicine educational programs (p.154)*

**Posters presented during the session on Tuesday**

Chaired by Noora Al Mheiri & Marc-Antoine Custaud

**11 - Devjoy Dev**

*Exploration of the biomechanical stress on the body while performing functional and operationally relevant movement patterns under variable gravitational stress (p.155)*

**12 - Kristina Sharlo**

*Effects of Muscle Electrical Stimulation under 6-day Dry Immersion on Soleus Muscle Signaling (p.156)*

**13 - Natalia Vilchinskaya**

*Time-course of alterations in the expression of mechanosensitive ion channels in rat soleus muscle under simulated microgravity (p.158)*

**14 - Ameline Saouli**

*Effects of Simulated Microgravity on Sperm Function: An In Vitro Study Evaluating Sperm Quality and Function-Specific Genes (p.159)*

**15 - Tiffany Stead**

*Examining Hypercoagulability in Females Exposed to Dry Immersion: a mechanism for Development of Venous Thromboembolism in Microgravity? (p.161)*

**16 - Irina Bryndina**

*Sphingolipids as regulators of skeletal muscle phenotype at gravitational unloading (p.163)*

**17 - Victoria Gulimova**

*X-Ray Phase Contrast Microtomography Investigation Of Thick-Toed Geckos Caudal Vertebrae After A Long-Term Space Flight Using Machine Learning (p.165)*

**18 - Andrew Blaber**

*Exploring Cardio-postural Interactions in relation to Prolonged Space Missions (p.167)*

**19 - Andréa Bertona**

*Evaluation of Short-Term Simulated Microgravity and Cognitive Task Effects on Central and Regional Hemodynamic Vascular Parameters during Progressive Head Down Tilt (HDT) Inclination (p.169)*

**20 - Karolina Almeida Borges**

*Repetitive Movements and Ultra Long Flights as Predictors Influencing Musculoskeletal Disorders Among Commercial Airline Pilots: A Cross-Sectional Study (p.170)*

**21- Sami Alghayath**

*Assessment of Hemodynamic and Autonomic Responses to Changes in Posture in Diabetics in Dubai: A Prospective Cohort Study (p.172)*