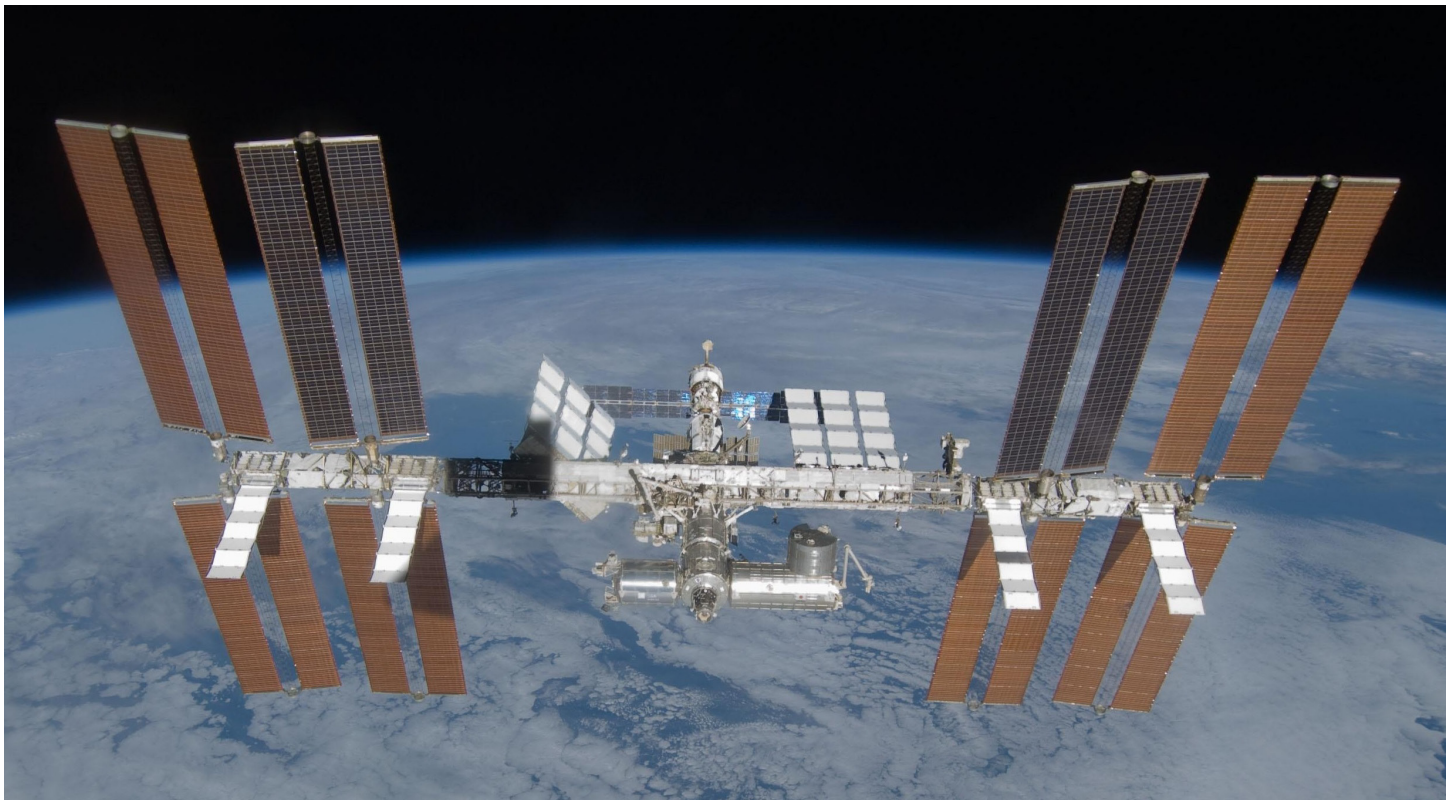
INTERNATIONAL SPACE MEDICINE SUMMIT 2013

May 16–19, 2013 ▪ Rice University's Baker Institute ▪ Houston, Texas



RICE UNIVERSITY'S BAKER INSTITUTE

ISMS International Space Medicine Summit

BCM Baylor College of Medicine

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About the Event

The International Space Medicine Summit (ISMS) 2013 is designed to bring together the world's leading physicians, space biomedical scientists, engineers, astronauts, cosmonauts and educators from the spacefaring nations for high-level discussions to identify not only necessary space medicine research goals, but also ways to change nationalistic policies that prevent coordination and collaboration.

Since Yuri Gagarin's first orbital flight in April 1961, more than 525 people from 37 countries have flown in space. However, only four Russian cosmonauts — Valeri Polyakov, Sergei Avdeyev, Musa Manarov and Vladimir Titov — have spent a year or more in space consecutively. Therefore, there is little data on long-duration spaceflight. As man dreams of returning to the Moon, or even landing on Mars, there must be much more research to prevent and/or mitigate the medical, psychological and biomedical challenges spacefarers face. The International Space Station (ISS) provides a viable laboratory in which to conduct the required research. It is essential that the station be utilized to its fullest potential through cooperative studies and the sharing of equipment and instruments between the international partners.

This conference is committed to fostering increased communication, collaboration and cooperation. By sharing and applying the lessons learned from long-duration human spaceflight and analog research environments, we can apply the resultant advances in technology and human knowledge not only to protect future space travelers, but also to enhance life on Earth.

Organizing Partners

Rice University's Baker Institute

The mission of the Baker Institute is to help bridge the gap between the theory and practice of public policy by drawing together experts from academia, government, media, business and nongovernmental organizations. By involving policymakers and scholars, as well as students (tomorrow's policymakers and scholars), the institute seeks to improve the debate on selected public policy issues and to make a difference in the formulation, implementation and evaluation of public policy, both domestic and international. The Baker Institute is an integral part of Rice University, one of the nation's most distinguished institutions of higher education. The efforts of Baker Institute fellows and affiliated Rice faculty focus on several ongoing research projects, details of which can be found on the institute's website, www.bakerinstitute.org.

Baylor College of Medicine

Baylor College of Medicine is committed to being a national leader in advancing human health through the integration of patient care, research, education and community service. The college pursues this mission by promoting patient care of the highest standard, advancing basic and clinical biomedical research, sustaining educational excellence, and fostering public awareness of health and the prevention of disease. Since its founding in 1900, Baylor has grown into an internationally respected medical and research institution. Baylor offers patient care services through several of its Texas Medical Center affiliate hospitals and clinics, with more than 152,000 inpatient visits and 2.2 million outpatient visits annually. The college has more than 70 research and patient-care centers and units. More information can be found on the school's website, www.bcm.edu.

Participating Organizations

Association of Air Medical Services (AAMS)
Association of American Medical Colleges (AAMC)
Athena Global
Bauman Moscow State Technical University (Bauman MSTU)
Baylor College of Medicine (BCM)
Boeing Space Exploration
Boise State University
Canadian Space Agency (CSA)
China Astronaut Research and Training Center (ACC)
Commonwealth Scientific and Industrial Research Organisation (CSIRO)
Gagarin Cosmonaut Research and Training Center (GCTC)
German Aerospace Center (DLR)
European Space Agency (ESA)
Excalibur Almaz
Harvard University
Henry Ford Health System (HFHS)
Institute for Biomedical Problems (IBMP)
International Space School Educational Trust (ISSET)
International Space University
Japan Aerospace Exploration Agency (JAXA)
King Abdulaziz City for Science and Technology (KACST)
King Faisal Specialist Hospital and Research Centre (KFSHRC)
King's College London
Korea Aerospace Research Institute (KARI)
Lunar and Planetary Institute (LPI)
Massachusetts Institute of Technology (MIT)
The Methodist Hospital (TMH)
Moscow State University
The Museum of Flight
National Aeronautics and Space Administration (NASA)
National Institutes of Health (NIH)
National Space Biomedical Research Institute (NSBRI)
Rice University
Rice University's Baker Institute
Russian Academy of Sciences
Russian Federal Space Agency (ROSCOSMOS)
Saudi Commission for Tourism and Antiquities
Shanghai Institutes for International Studies (SIIS)
Swansea University
Tietronix/Safetronix
UK Space Agency
Universities Space Research Association (USRA)
University College London (UCL)
University of Geneva
University of Houston (UH)
University of Roma Tor Vergata
University of Southampton
The University of Texas Health Science Center at Houston (UTHSC)
The University of Texas Medical Branch at Galveston (UTMB)
The University of Texas Southwestern Medical Center at Dallas (UTSW)
Wyle

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Conference Agenda

Thursday, May 16

1830 Opening Reception
BioScience Research Collaborative, Rice University

Friday, May 17

0800 Continental Breakfast

Welcome, Introductions and Opening Remarks

0830 **The Honorable Edward P. Djerejian**
Founding Director, Rice University's Baker Institute

George W.S. Abbey
Baker Botts Senior Fellow in Space Policy, Rice University's Baker Institute

Bobby R. Alford
Distinguished Service Professor, Baylor College of Medicine, and
Chairman, National Space Biomedical Research Institute

Keynote Address

0845 **Introduction:** Neal F. Lane, Baker Institute

Eric Desautels
Chief of Staff, Office of Arms Control and International Security, U.S. Department of State

Panel I — History of Russian Long-duration Spaceflights: Significant Results and Considerations

Moderator: Igor Ushakov, IBMP

0930 **Introduction:** Bobby R. Alford, BCM/NSBRI

Panelists
- Sergey Avdeev, Cosmonaut
- Valery V. Bogomolov, IBMP
- Inessa Kozlovskaya, IBMP
- Yuri Malenchenko, Cosmonaut
- Salizhan S. Sharipov, Cosmonaut
- Eugenya Yarmanova, IBMP

Topics
- Expectations
- Outcomes
- Scientific discoveries and results
- Lessons learned and future applications
- Medical events (addressed and open)
- The Russian perspective: What is the most important problem?

Discussion and Summation

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Luncheon

1200 **Introduction:** Bobby R. Alford, BCM/NSBRI

Bert O'Malley
Thomas C. Thompson Distinguished Service Professor and Chair,
Department Molecular and Cellular Biology, Baylor College of Medicine

Panel II — Planning for Long-duration Missions

Moderator: Jeff Sutton, NSBRI

1300 **Introduction:** Igor Ushakov, IBMP

Panelists

Mathias Basner, NSBRI
Valery V. Bogomolov, IBMP
John Charles, NASA
Jeff Davis, NASA
Michael Fincke, Astronaut
Mikhael Kornienko, Cosmonaut
Inessa Kozlovskaya, IBMP
Christian Otto, USRA
Boris Morukov, Cosmonaut
Igor Savelev, Wyle
Peggy Whitson, Astronaut
Jeff Williams, Astronaut
Eugenya Yarmanova, IBMP

Topics

- Resources and implementation logistics
- Science priorities
- Engineering challenges

Discussion and Summation

1500 Break

Panel III — Maximizing Scientific Return From the Integrated Use of Facilities and Crew

Moderator: William Gerstenmaier, NASA

1515 **Introduction:** Valery V. Bogomolov, IBMP

Panelists

Rupert Gerzer, ESA
Inessa Kozlovskaya, IBMP
Yuri Malenchenko, Cosmonaut
Boris Morukov, Cosmonaut
Chiaki Mukai, Astronaut
Donald R. Pettit, Astronaut
Lakshmi Putcha, NASA
David St. Jacques, Astronaut
Graham Scott, NSBRI

Topics

- Sharing facilities, results and inventory
- Availability of crew

Discussion and Summation

1700 Reception

Dinner and Keynote Address

1800 **Introduction:** Igor Ushakov, IBMP

Tereshkova Video Presentation

Introduction: The Honorable Edward P. Djerejian, Baker Institute

The Honorable James A. Baker, III
Honorary Chair, Rice University's Baker Institute

Saturday, May 18

0800 Continental Breakfast

Graduate Student Poster Presentations

Panel IV — The Life Science Challenges of Long-duration Human Exploration Flights

Moderator: John Charles, NASA

0830 **Introduction:** Leroy Chiao, Astronaut

Panelists

Valery V. Bogomolov, IBMP
Jay Buckey, Astronaut
Jeff Chancellor, NSBRI
Mike Fincke, Astronaut
Vadim Guschin, IBMP
Chiaki Mukai, Astronaut
Peter Norsk, USRA
William "Bill" Paloski, UH
Michelle Perchonok, NASA
Lakshmi Putcha, NASA
Graham Scott, NSBRI
Sharmila Watkins, Wyle

Topics

- Radiation
- Crew health, conditioning and well-being
- Food and provisions
- "Omics" and human space flight
- Scientific debate regarding duration of flights
- Effects on reproductive systems
- Neurobehavioral, psychological and interpersonal dynamics
- Fetal development during spaceflight

Discussion and Summation

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Panel V — Visual Impairment and Intracranial Pressure (VIIP)

Moderator: Volker Damann, ESA

1030 **Introduction:** Valery V. Bogomolov, IBMP

Panelists

David Baskin, TMH
Yael Barr, NASA
Valery V. Bogomolov, IBMP
Dorit Donoviel, NSBRI
Inessa Kozlovskaya, IBMP
Larry Kramer, UTHSC
Benjamin Levine, UTSW
Vladimir Pochuev, GCTC
Joel Rizzo, Harvard
Graham Scott, NSBRI
Yuri Voronkov, IBMP

Topics

- Definition of "syndrome" and "problem"
- Operational implications
- Monitoring oral and other treatment options
- Ongoing investigations

Discussion and Summation

Luncheon

1130 **Introduction:** George W.S. Abbey, Baker Institute

William Gerstenmaier
Associate Administrator for Human Exploration and Operations, NASA

Graduate Student Poster Presentations

Live Connection to Antarctic Science Station

Moderator: Graham Scott, NSBRI

1230 Topics

- Challenges of medical care
- Emergencies in remote locations

Panel VI — Future Analogs

Moderator: Boris Morukov, IBMP

1310 **Introduction:** Jeff Sutton, NSBRI

Panelists

Jay Buckey, Astronaut
David Dinges, NSBRI
Rupert Gerzer, ESA
Vadim Guschin, IBMP
Inessa Kozlovskaya, IBMP
Chiaki Mukai, Astronaut
Pascal Lee, NASA
Mark Reagan, NASA
David St. Jacques, Astronaut

Igor Ushakov, IBMP
Eugenya Yarmanova, IBMP

Topics

- Desired characteristics for an analog
- International Space Station as a possible analog
- Follow-up to the 500-day Study
- Other international analogs

Discussion and Summation

Panel VII — Education

Moderator: Karl Doetsch, Athena Global

1400 **Introduction:** Eugene Levy, Rice

Panelists

Chris Barber, ISSET
Bonnie Dunbar, Astronaut
Francesco Fusco, Boeing
Alex Garbino, BCM
Vadim Guschin, IBMP
Steve Mackwell, LPI
Mike Massimino, Astronaut
Barbara Morgan, Astronaut
Jeff Sutton, NSBRI
William Thomson, BCM
Jim Tour, Rice

Topics

- Stimulating interest in science and engineering education
- Benefits of an international educational program
- Space as a catalyst for learning
- Opportunities for student exchange programs
- International Space University

Discussion and Summation

1500 Break

Discussion Groups

Team member assignments to be provided

1530 **Group A**
Implementing Space Station Research and Sharing Facilities
Team Leader: Inessa Kozlovskaya, IBMP

Group B
Addressing Life Science Challenges of Long-duration Human Exploration Missions
Team Leader: Leroy Chiao, Astronaut

Group C
Education Needs and Career Opportunities
Team Leader: Karl Doetsch, Athena Global

Reception and Dinner

1800 **Introduction:** George W.S. Abbey, Baker Institute

Crew of STS134

Introduction: Andrew Feustel and Mike Fincke, STS134 Astronauts

Launch of the Alpha Magnetic Spectrometer

Samuel Ting
Nobel Laureate

Shepherd School Ensemble

Sunday, May 19

0830 Continental Breakfast

Discussion Group Reports

0900 **Group A**
Implementing Space Station Research and Sharing Facilities

Group B
Addressing Life Science Challenges of Long-duration Human Exploration Missions

Group C
Education Needs and Career Opportunities

Closing Remarks

1115 **Bobby R. Alford**
Distinguished Service Professor, Baylor College of Medicine, and
Chairman, National Space Biomedical Research Institute

George W.S. Abbey
Baker Botts Senior Fellow in Space Policy, Rice University's Baker Institute