1st Annual ISS Research and Development Conference

Results and Opportunities – The Decade of Utilization

June 26-27, 2012

Denver Marriott City Center
1701 California Street
Denver, Colorado 80202

American Astronautical Society
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NASA

CASIS℠
Center for the Advancement of
SCIENCE IN SPACE

1st Annual ISS Research and Development Conference

June 26-27, 2012

Denver Marriott City Center, 1701 California Street, Denver, Colorado 80202

Organized by the American Astronautical Society in cooperation with the Center for the Advancement of Science in Space Inc. (CASIS) and NASA

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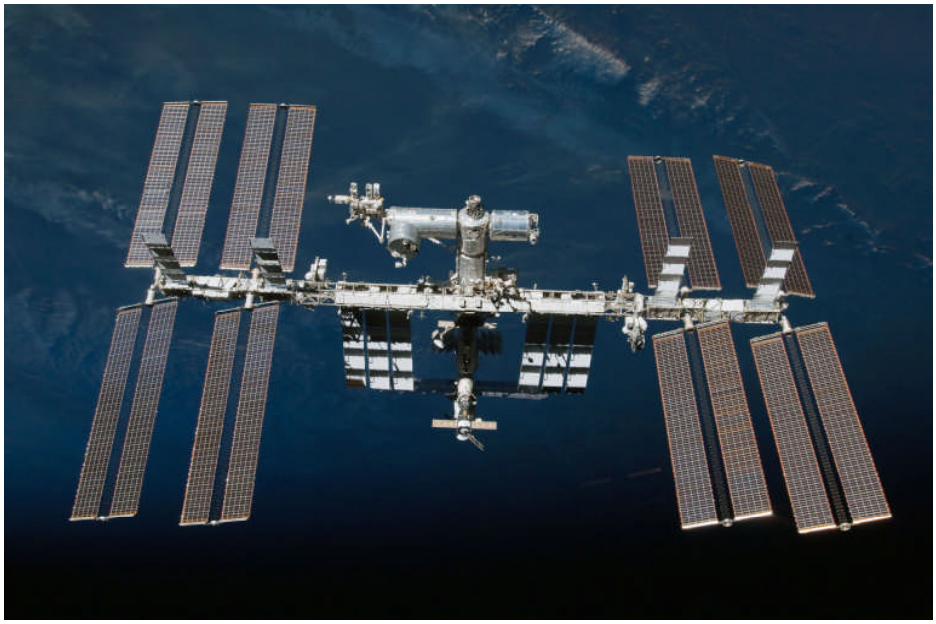

This conference focuses on ISS R & D — research results and future opportunities in physical sciences, life sciences, Earth and space sciences, and spacecraft technology development. Plenary sessions will highlight major results and pathways to future opportunities. Organizations managing and funding research on ISS, including NASA programs and the ISS National Laboratory will provide overviews of upcoming opportunities. Parallel technical sessions will provide tracks for scientists to be updated on significant accomplishments to date within their disciplines. On June 28. NASA will conduct a separate workshop designed to help new users take this information and develop their own ideas for experiments using this unique laboratory, as well as a SBIR Technologies workshop. Potential ISS users who attend will learn: "What can I do on the ISS? How can I do it?"

This is the only annual gathering offering perspectives on the full breadth of research and technology development on ISS, and includes one stop for the full suite of opportunities for future research.

Conference Technical Co-Chairs

Dr. David B. Spencer, Vice President Technical, AAS
Department of Aerospace Engineering
The Pennsylvania State University
University Park, PA

Dr. Julie Robinson, ISS Program Scientist
NASA Johnson Space Center
Houston, TX

Conference Executive Chairs

Walt Faulconer, Vice President Programs, AAS
Strategic Space Solutions, LLC
Glenelg, MD

Donna Shortz, ISS Office
NASA Headquarters
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Marshall Porterfield, Purdue Univ
Tara Ruttley, NASA JSC
Alan Stern, SwRI
Louis Stodieck, Univ. of Colorado
Allyson Thorn, NASA JSC
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At A Glance

	MONDAY June 25th	TUESDAY June 26th	WEDNESDAY June 27th		THURSDAY June 28th	
0700		Registration & Breakfast	Registration & Breakfast			
0800		Welcome &	Opening Remarks			IMSPG
		Keynotes	8:15 Discussion	ISS	SBIR	
0900			Panel	Utilization	Technologies	
			9:45 Technical	Workshop	Workshop	
1000		Discussion	Session 3	For New	& Displays	
		Panel		Investigators		
1100				& Displays		
			11:45 Lunch			
1200		Luncheon	(on your own)			
1300			1:15 Discussion			
		1:30 Featured Speaker	Panels			
1400		Technical Session 1				
1500						
			Technical Session 4			
1600		4:15 Technical Session 2				
1700						
	Registration		Adjourn			
1800	Reception,	6:15 Adjourn	Reception,			
	Hotel		Hotel			
1900		Reception,				
		Denver Museum				
2000						

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General Sponsors – Lockheed Martin & Boeing

Program

Day 1, Monday June 25

6:00 pm **Welcome Reception at the Denver Marriott City Center**. Come join us for a casual reception and networking. Colorado Ballroom A - D

Day 2, Tuesday June 26

7:00 am **Registration Opens and Continental Breakfast** *sponsored by United Launch Alliance*

7:00 am **AAS Corporate Members Breakfast** *(invitation only)* Molly Brown Room
with William Gerstenmaier, Waleed Abdalati and Mike Suffredini

8:00 am **Welcome and Announcements** Colorado Ballroom A - E
Frank Slazer, President of AAS
Recorded Opening Message from the Crew on the ISS

8:15 am **Industry Remarks**
John Karas, Vice President and General Manager of Human Space Flight, Lockheed Martin Space Systems Company

8:30 am **Opening Remarks and Introduction of Keynote Speaker**
Mike Suffredini, ISS Program Director, NASA Johnson Space Center

8:45 am **Keynote: "The Next Decade of ISS and Beyond"**
William Gerstenmaier, Associate Administrator for Human Exploration and Operations, NASA Headquarters

9:15 am **Keynote: "The Future of Research in Human Spaceflight"**
Waleed Abdalati, NASA Chief Scientist

9:45 am **Break** *sponsored by United Launch Alliance*

10:00 am **Discussion Panel 1: "ISS – Top Science and Technology Results"**
Moderator: Julie Robinson, ISS Program Scientist, NASA Johnson Space Center

- "Drug Therapy of Duchenne Muscular Dystrophy with Inhibitors of Hematopoietic Prostaglandin D Synthase" – Yoshihiro Urade, Osaka Bioscience Institute
- "The Microgravity Research Platform: Novel Insights into the Mechanisms and Treatment of Infectious Disease" – Cheryl Nickerson, Arizona State University
- "Multiphase Research Toward the Development of Novel Fluid Management Systems Aboard Spacecraft" – Ryan Jenson, IRPI LLC and Mark Weislogel, Portland State University
- "The HICO-RAIDS Experiment Payload Mission" – Scott Budzien, Naval Research Laboratory
- "Advanced Diagnostic Ultrasound in Microgravity" – Shannon Melton, Wyle
- "NASA's Current Evidence and Hypotheses for the Visual Impairment Intracranial Pressure Risk" – Christian Otto, Universities Space Research Association

12:00 pm **Luncheon Colorado Ballroom F - J**
Welcome and Introduction: Joy Bryant, Vice President & Program Manager, International Space Station, Boeing Defense Space & Security
Introduction: Sergey Avdeev, TSNIIMASH (Roscosmos)
Lunch Speaker: Astronaut E. Michael Fincke, "An Introduction to ISS and its Discovery Potential"

1:30 pm **Featured Speaker (Plenary)** "Alpha Magnetic Spectrometer (AMS) Status and Results," Andrei Kounine, Principal Research Scientist, Laboratory for Nuclear Science, MIT

2:00 pm **Parallel Technical Session One** (see Page 10)

Denver 1-2	Denver 3	Denver 4	Denver 5-6	Mattie Silks
Human Research	**SPHERES Facility**	**Communications & Navigation Technologies**	**Space Science on ISS**	**Plant Biology in Space**
Chair: John Charles	Chair: Alvar Saenz-Otero	Chair: Kevin Gifford	Chair: Vernon Jones	Chair: Howard Levine

4:00 pm **Break** *sponsored by United Launch Alliance*

4:15 pm **Parallel Technical Session Two** (see Page 11)

Denver 1-2	Denver 3	Denver 4	Denver 5-6	Mattie Silks
Biotechnology	**Materials Science & Combustion Science**	**Spacecraft Systems Technology**	**Technical Earth Imaging**	**Fundamental Physics**
Chair: Louis Stodieck	Chair: Fred Kohl	Chair: Al Holt	Chair: Will Stefanov	Chair: Ulf Israelsson

6:15 pm **Adjourn**

7:00 pm **Reception at the Denver Museum of Nature and Science**
- Shuttle bus service provided from hotel to/from museum (Hotel Main Entrance)

Day 3, Wednesday, June 27

7:00 am **Registration Opens / Continental Breakfast** *sponsored by Ball Aerospace & Technologies Corp*

8:00 am **Opening Remarks by** Marybeth Edeen, Deputy, ISS Research Office, NASA JSC

8:15 am **Discussion Panel 2: "Enabling Exploration Beyond Earth Orbit"**
Moderator: George Nelson, ISS Technology Demonstration Manager, NASA Johnson Space Center
- "Robotic Refueling Mission (RRM): Paving the Way for In-Space Robotic Refueling and Repair" – Jill McGuire, NASA GSFC
- "SPHERES National Lab Facility" – Mark Micire, NASA ARC
- "Optical PAyload for Lasercomm Science (OPALS): A COTS-based Technical Demonstration of Optical Communications" – Bogdan Oaida, NASA JPL
- "Space-based, On-Demand Fabrication of Metallic Parts Using Additive Manufacturing" – Karen Taminger, NASA LaRC
- "Environmental Control and Life Support System (ELCSS) Capability Development Roadmap for Exploration" – Jordan Metcalf, NASA JSC
- "Highlights of DoD Payloads on the ISS" – James McLeroy, DoD Space Test Program

9:45 am **Parallel Technical Session Three** (see Page 13)

Denver 1-2	Denver 3	Denver 4	Denver 5-6	Mattie Silks
Technologies for Exploration Applications	**Earth Science**	**Cell Biology and Tissue Engineering**	**Human Exploration**	**Education**
Chair: Al Holt	Chair: Will Stefanov	Chair: Beverly Girten	Chair: John Charles	Chair: Marybeth Edeen

11:45 am **Lunch – On Your Own**

1:15 pm **Round-Robin Discussion Panel 1 (Plenary): "Upcoming Opportunities on the ISS – NASA-funded"**

Moderator: Marshall Porterfield, Purdue University

- "NASA Human Research Program" – John Charles, NASA JSC
- "NASA Space Life and Physical Sciences Research and Applications" – Marshall Porterfield, Purdue University
- "NASA Technology Development and SBIR Exploration Technology" – Richard Leshner, NASA Headquarters

2:15 pm **Round-Robin Discussion Panel 2 (Plenary): "Upcoming Opportunities on the ISS - ISS National Laboratory"**

Moderator: James Royston, Interim Director, Center for the Advancement of Science in Space (CASIS)

- "Emerging Marketplace Opportunities" – Deepak Agrawal, CASIS
- "A Comprehensive Evaluation of Microgravity Protein Crystallization" – Larry DeLucas, University of Alabama at Birmingham
- "Commercial Flight Opportunities with NanoRacks" – Jeffery Manber, NanoRacks LLC

3:15 pm **Break** *sponsored by Ball Aerospace & Technologies Corp*

3:30 pm **Parallel Technical Session Four** (see Page 14)

Denver 1-2	Denver 3	Denver 4	Denver 5-6
Small Business and Innovative Research Successes	**Animal Biology in Space**	**Robotics**	**Fluid Physics**
Chair: Marybeth Edeen	Chair: Beverly Girten	Chair: Myron Diftler	Chair: Fran Chiaramonte

5:30 pm **Adjourn**

6:00 pm **Reception** The Plaza (outdoors)

Thursday, June 28

Space Station Utilization Workshop for New Investigators

(held concurrently with SBIR Technologies Workshop and International Microgravity Strategic Planning Group)

8:00 Continental Breakfast Prefunction Area

8:30 Welcome and Announcements Denver 1-2-3

8:45 Payload Process Workshop

08:45 – 09:00	Sponsorship
09:00 – 09:45	ISS Payload Office – Payload Development to Operations to Post-Flight
09:45 – 10:00	Break
10:00 – 12:00	CASIS Approach and Pathway Overview
12:00 – 12:30	Q&A / Lessons Learned

12:30 Buffet Lunch *sponsored by CASIS*

1:30 What is an Implementation Partner?
Moderators: NLO and CASIS

1:45 Implementation Partner Displays (will be set up all day) Denver 4-5-6

4:00 Adjourn

SBIR Technologies Workshop

(held concurrently with Space Station Workshop for New Investigators and International Microgravity Strategic Planning Group)

8:00 Continental Breakfast

8:30 Welcome and Announcements Nat Hill and Pomeroy (3rd Floor)

9:00 SBIR Technologies Presentations in the following tentative topic areas:
(Two Tracks – Nat Hill & Pomeroy)

- Processing and Operations (including ISS Utilization)
- Space Communications
- Space Transportation
- Navigation
- Life Support and Habitation Systems
- Extra-Vehicular Activity Technology
- Human Research Program (related topics)

12:30 Buffet Lunch ***sponsored by CASIS***

1:30 SBIR Technologies Presentations tentative topic areas (cont.)

- Autonomous Systems and Avionics
- Human-Robotic Systems
- High-Efficiency Space Power Systems
- Radiation Protection
- Sensors, Detectors, and Instruments
- Spacecraft and Platform Subsystems
- Low-Cost Small Spacecraft and Technologies

4:00 Adjourn

Note: SBIR displays will be included with those from the Implementation Workshop in Denver 4-5-6.

International Microgravity Strategic Planning Group (IMSPG)

(held concurrently with Space Station Workshop for New Investigators and the SBIR Technologies Workshop)

The **International Microgravity Strategic Planning Group (IMSPG)** will meet June 28 from 8:00 am – 5:00 pm in the Matchless Room. The purpose of this meeting is to review the physical sciences research programs from the International Partners and other national space agencies. This is an open meeting.

For information contact Fran Chiaramonte, Ph.D., Program Executive for Physical Sciences, NASA Headquarters at francis.p.chiaramonte@nasa.gov

Save the Date!

The 2nd Annual International Space Station Research and Development Conference

When:	**June 2013**
Where:	**TBD**
Call For Papers:	**September 2012**
Abstracts Due:	**March 1, 2013**

Parallel Technical Sessions

Day 2, Tuesday June 26

1:00 pm to 3:00 pm **Parallel Technical Session One**

Denver 1-2	Denver 3	Denver 4	Denver 5-6	Mattie Silks
Human Research	**SPHERES Facility**	**Communications & Navigation Technologies**	**Space Science on ISS**	**Plant Biology in Space**
Chair John Charles	Chair: Alvar Saenz-Otero	Chair: Kevin Gifford	Chair: Vernon Jones	Chair: Howard Levine

Human Research – John Charles, NASA JSC

- *Sleep and Circadian Rhythms on ISS*; Laura Barger, Brigham & Women's Hospital
- *Behavioral Health on ISS*; David Dinges, University of Pennsylvania
- *Bone Loss and Countermeasures on ISS*; Adrian Leblanc, USRA
- *Self-reported Psychological Aspects of ISS Missions*; Jack Stuster, Anacapa Sciences, Inc.
- *Sample size considerations for ISS human research*; Robert Ploutz-Snyder, USRA

SPHERES Facility – Alvar Saenz-Otero, MIT

- *Admissible Subspace Trajectory Optimizer (ASTRO) Algorithm Development using SPHERES aboard ISS*; Gregory Chamitoff, MIT
- *Acquisition of Long-Duration, Low-Gravity Slosh Data Using SPHERES for Calibration of CFD Models of Coupled Fluid-Vehicle*; Brandon Marsell, a.i. solutions
- *SPHERES INTERACT*; Vadim Slavin, Lockheed Martin
- *Electromagnetic Formation Flight and Wireless Power Transfer with Rings: The Resonant Inductive Near-Field Generation System*; Ray Sedwick, University of Maryland
- *The Enhanced Expansion Port on the SPHERES-ISS Facility, and Evaluation of the Chip-Scale Atomic Clock on SPHERES*; John Merk, Aurora Flight Sciences
- *On-Orbit Propellant Storage and Transfer Technologies Utilizing SPHERES Testing Facility*; Nathan Silvernail, Embry-Riddle Aeronautical University

Communications and Navigation Technologies – Kevin Gifford, University of Colorado

- *Upgrading ISS Data Rates to Achieve Greater Scientific Return*; Mike Norris, L-3 Communication Systems West
- *Multi-Gb/s Lasercom Testbed (LTB) for the ISS*; Hamid Hemmati, NASA JPL

- *Onboard Wireless Technologies In Support of ISS Experimentation and Operations*; Raymond Wagner, Jacobs/ESCG

- *ISS as a Technology Demonstration Platform to Verify Operational Utilization of Disruption Tolerant Networking (DTN)*; Kevin Gifford, University of Colorado

- *Commercial Delay Tolerant Pervasively Networked Point-of-Presence Gateway System for ISS*; Gary Barnhard, Barnhard Associates, LLC

Space Science on ISS – Vernon Jones, NASA HQ

- *2011 Explorer/MO Heliophysics Study "Coronal Physics Investigator (CPI) Experiment for the ISS"*; Daniel Reisenfeld, University of Montana

- *2011 Explorer/MO Astrophysics Study "Neutron Star Interior Composition ExploreR (NICER) for the ISS";* Jason Mitchell, NASA GSFC

- *2010 ROSES NRA Astrophysics Study "Cosmic Ray Energetics and Mass (CREAM) on the ISS JEM/EF"*; Eun-Suk Seo, University of Maryland

- *2011 Roses NRA Astrophysics NOI "Extreme Universe Space Observatory on the ISS (JEM-EUSO)"*; Jim Adams, University of Alabama

- *The ISS as a Testbed for Future Large Astronomical Observatories: "The OpTIIX Demonstration Program";* Ulf Israelsson, NASA JPL

Plant Biology in Space – Howard Levine, NASA KSC

- *Plant Signaling in Microgravity*; Christopher Brown, North Carolina State University

- *Spaceflight Transcriptomes: Unique Responses to a Novel Environment*; Anna-Lisa Paul, University of Florida

- *Organ-Specific Effects of Spaceflight on Cell Remodeling and Gene Expression*; Robert Ferl, University of Florida

- *Microgravity Effects on the Early Events of Biological Nitrogen Fixation in Medicago truncatula (SyNRGE);* Michael Roberts, QinetiQ NA-ESC

- *Microsystems for Cell Electrophysiology in Spaceflight Systems;* Marshall Porterfield, Purdue University

3:15 pm To 5:15 pm **Parallel Technical Session Two**

Denver 1-2	Denver 3	Denver 4	Denver 5-6	Mattie Silks
Biotechnology	**Materials Science & Combustion Science**	**Spacecraft Systems Technology**	**Technical Earth Imaging**	**Fundamental Physics**
Chair: Louis Stodieck	Chair: Fred Kohl	Chair : Al Holt	Chair: Will Stefanov	Chair: Ulf Israelsson

Biotechnology – Louis Stodieck, BioServe Space Technologies, University of Colorado

- *Effects of Microgravity on Jatropha curcas L. in Vitro Cell Cultures*; Wagner Vendrame, University of Florida at Homestead

- *New 3D Tumor Growth & Drug Sensitivity Assay Models for Microgravity Research*; Raj Singh, Vivo Biosciences Inc

- *Yeast Genomics Studies on Board the Space Shuttle and ISS*; Timothy Hammond, Durham Veteran's Administration Medical Center

- *A Comprehensive Evaluation of Microgravity Protein Crystallization*; Larry DeLucas, University of Alabama, Birmingham

- *Agricultural Research Opportunities on the International Space Station (ISS) National Laboratory;* Neil Talbot, USDA

Materials Science & Combustion Science – Fred Kohl, NASA GRC

- *Materials International Space Station Experiment-X (MISSE-X):* The Next Generation; Kim de Groh, NASA GRC

- *Coarsening in Solid-Liquid Mixtures (CSLM): Results from the ISS;* John Thompson, Northwestern University

- *Dynamical Evolution of Three-Dimensional Interface Patterns in Directional Solidification of Alloys: Results from ISS Experiments;*, Rohit Trivedi, Iowa State University

- *Flame Extinguishment Experiment (FLEX): A Decisive Step Forward in NASA's Combustion Research Program*; Mark Hickman, NASA GRC

- *Combustion Research in the Microgravity Science Glovebox*; Dennis Stocker, NASA GRC

- *Science and Applications on ISS within ESA's ELIPS Program*; Olivier Minster, ESA

Spacecraft Systems Technology – Al Holt, NASA JSC

- *SCAN Testbed, Overview and Opportunity for Experiments*; Richard Reinhart; NASA GRC

- *Instrument for Characterizing the Population and Distribution of Sub-Centimeter Size Orbital Debris*; Albert Sadilek, U.S. Naval Academy

- *Water Electrolysis Testing for On-Demand Space Propellant Depot Design;* Bogdan Udrea, Embry-Riddle Aeronautical University

- *Trace Chemical and Major Constituents Measurements of the ISS Atmosphere by the Vehicle Cabin Atmosphere Monitor*; Murray Darrach, NASA JPL

- *Acceleration Measurement and Analysis Projects…Over a Decade of Support for the ISS*; Ken Hrovat, ZIN Technologies, Inc

Technical Earth Imaging – Will Stefanov, Jacobs/ESCG

- *ISS Agricultural Camera (ISSAC™) - Remote Sensing from the ISS*; Doug Olsen, University of North Dakota

- *ISERV Pathfinder: A Low Cost, COTS-Based Earth Imaging System aboard the ISS;* Burgess Howell, USRA

- *Opportunities to Intercalibrate Radiometric Sensors from ISS*; Carlos Roithmayr, NASA LaRC

- *The Cloud-Aerosol Transport System (CATS): A new Earth Science capability for ISS*; Matthew McGill, NASA GSFC

- *Nighttime Ionosphere Tomographic Reconstruction Observatory (NITRO);* Scott Budzien, Naval Research Laboratory (NRL)

Fundamental Physics – Ulf Israelsson, NASA JPL

- *Critical Phenomena Experiments in Microgravity: An Overview*; Inseob Hahn, NASA JPL
- *Dusty Plasmas under Microgravity Conditions*; John Goree, University of Iowa
- *Atomic Clocks and Precision Measurements on ISS*; Robert Thompson, NASA JPL
- *The Coldest Spot in the Universe: A Facility for Ultra-Cold Atom Experiments aboard the ISS*; Robert Thompson, NASA JPL
- *International Time and Frequency Inter-comparisons using ACES and the ISS;* Steven Jefferts, National Institute of Standards and Technology (NIST)

Day 3, Wednesday, June 27

9:45 am to 11:45 am **Parallel Technical Session Three**

Denver 1-2	Denver 3	Denver 4	Denver 5-6	Mattie Silks
Technologies for Exploration Applications	**Earth Science**	**Cell Biology and Tissue Engineering**	**Human Exploration**	**Education**
Chair: Al Holt	Chair: Will Stefanov	Chair: Beverly Girten	Chair: John Charles	Chair: Marybeth Edeen

Technologies for Exploration Applications – Al Holt, NASA JSC

- *VERTIGO Goggles: An Experimental Micro-Gravity Testbed for Spacecraft Vision Based Navigation*; Brent Tweddle, MIT
- *Debris Impact Detection Instrument for Crewed Modules*, John Opiela, Jacobs/ESCG
- *Pulsar Navigation and X-ray Communication Demonstrations with the NICER Payload on the ISS*; Jason Mitchell, NASA GSFC
- *Additive Manufacturing In Long Duration Autonomous Space Missions As an Alternative to Storing Maintenance and Repair Parts*; Giorgio Musso, Thales Alenia Space Italia
- *Use of ISS for Validation of Advanced Power Systems for Exploration*; James F. Soeder, NASA GRC

Earth Science – Will Stefanov, Jacobs/ESCG

- *Crew Earth Observations (CEO): Twelve Years of Documenting Earth from the ISS*; Will Stefanov, Jacobs/ESCG
- *The Remote Atmospheric and Ionospheric Detection System (RAIDS): Science Results and Lessons Learned*; Andrew Stephan, Naval Research Laboratory (NRL)
- *Hyperspectral Imager for the Coastal Ocean (HICO) Imagery for Coastal and Ocean Protection- A Case Study from Florida;* Darryl Keith, Environmental Protection Agency (EPA)
- *Earth Science with the Stratospheric Aerosol and Gas Experiment III (SAGE III) on the ISS;* David Flittner, NASA LaRC
- *Scientific Contributions Expected from the Orbiting Carbon Observatory-3 (OCO-3) if Installed on the ISS;* Annmarie Eldering, NASA JPL

Cell Biology and Tissue Engineering – Beverly Girten, NASA ARC

- *The Stress and Antibiotic Response of Clinical Isolate Pseudomonas aeruginosa PA 14 to Altered Gravity Conditions;* Jane Hill, University of Vermont
- *Analysis of Intestinal Epithelial Barrier Function on the ISS*; Declan McCole, University of California San Diego
- *A Novel Microbial Cell Cultivation Platform for Space Applications;* Halil Berberoglu, University of Texas at Austin
- *A Proposed Gravitationally Modulated Chemo-Sensitivity Study of LNCaP Cancer Cells;* Rolando Branly, Broward College Florida

Human Exploration – John Charles, NASA JSC

- *Preflight and In-Flight Exercise Conditioning For Astronauts on the ISS*; Mitzi Laughlin, Wyle
- *Progress of AGREE Project: Multilateral Project on the Effectiveness of Artificial Gravity with Ergometric Exercise*; Satoshi Iwase, Aichi Medical University
- *Evaluating Sensorimotor Function Before, During, and After Long-Duration ISS Flight - Consequences and Countermeasures;* Mark Shelhamer, Johns Hopkins University School of Medicine.
- *Human Physiology and Psychology factors: 100B ILEWG EuroMoonMars Mission*; Balwant Rai, Vrije Universiteit Amsterdam

Education – Marybeth Edeen, NASA JSC

- W*indows on Earth – Astronaut Photography for Earth Science Education (CEO);* Daniel Barstow, TERC, Inc.
- T*he Cube Lab Standard and Small Payload Integration and Operation aboard the ISS;* James Lumpp, University of Kentucky
- *Design and Development of Zero Robotics: From STEM Outreach to a Distributed Innovation Platform for the SPHERES Facility;* Jacob Katz, MIT
- *NanoLabs: A Proven Low Cost Method to Get Student Experiments into Space and Back Within the School Year;* Dan Saldana, Valley Christian High School, San Jose
- *YouTube Space Lab Competition;* Tom Shelley, Space Adventures

3:30 pm To 5:30 pm **Parallel Technical Session Four**

Denver 1-2	Denver 3	Denver 4	Denver 5-6
Small Business and Innovative Research Successes	**Animal Biology in Space**	**Robotics**	**Fluid Physics**
Chair: Marybeth Edeen	Chair: Beverly Girten	Chair: Myron Diftler	Chair: Fran Chiaramonte

SBIR – Marybeth Edeen, NASA JSC

- *LIDAR Technology Avionics and Laser Flight Hardware for the Cloud-Aerosol Transport System (CATS)*; Mark Storm, Fibertek, Inc.
- *NanoRacks Utilization Opportunities for the ISS*; Mike Johnson, NanoRacks LLC

- *On-orbit Immuno-based Label-free White Blood Cell Counting System with MicroElectroMechanical Sensor Technology*; Jessica Duda, Aurora Flight Sciences

- *Tools for On-orbit Sample Processing and Analysis*; John Vellinger, Techshot, Inc.

- *Ultra-Light Heat Pipe Radiators for High-Efficiency Heat Rejection*; Jay Rozzi, Creare Inc.

Animal Biology in Space – Beverly Girten, NASA ARC

- *Assessing the Biological Effects of Spaceflight Using Drosophila Melanogaster*; Sharmila Bhattacharya, NASA ARC

- *Influence of Duration and Magnitude of Gravity Loading on Mouse Inner Ear Otoconia*; Richard Boyle, NASA ARC

- *Spaceflight Alters Cardiac Gene Expression in Mice*; Akhilesh Kumar, USRA

- *Alterations in Factors Associated with Endothelial Cell Function in the Hind Limbs of Mice flown aboard STS-135;* Caroline Androjna, Cleveland Clinic

- *Of Mice and Microgravity: Does SIRT3 play a role in oxidative stress-induced metabolic dysfunction?* Karen Jonscher, University of Colorado Denver

Robotics – Myron Diftler, NASA JSC

- *Technology and Mission Applications for Small Robotic Freeflyers (Exo-SPHERES*); David Akin, University of Maryland

- *A Formal Model of Autonomous System Control and Communication*; Yujian Fu, Alabama A&M University

- *Surface Telerobotics from the ISS;* Maria Bualat, NASA ARC

- *Advancing Robotic Control for Space Exploration using Robonaut 2;* Julia Badger, NASA JSC

- *SMART SPHERES: Testing Free-Flyer Robot Concepts for Future Human Missions*; Mark Micire, NASA ARC

Fluid Physics - Fran Chiaramonte, NASA HQ

- *A Transparent Heat Pipe on the ISS: Lessons from the Constrained Vapor Bubble (CVB) Experiment*; Joel Plawsky, Rensselaer Polytechnic Institute

- *Pool Boiling Heat Transfer in Microgravity: Results from the Microheater Array Boiling Experiment (BXF-MADE) on the ISS*; Jungho Kim, University of Maryland

- *Capillary Channel Flow (CCF) Experiments on the ISS*; P. Max Bronowicki, ZARM University of Bremen,

- *Exploring Near-Critical Phase-Separation in Long-Term Microgravity with Binary Colloidal Alloy Test (BCAT);* Peter Lu, Harvard University

- *The Packed Bed Reactor Experiment*; Brian Motil , NASA GRC

Edward Michael "Mike" Fincke (Colonel, USAF)
NASA Astronaut – Guest Luncheon Speaker

Spaceflight Experience

ISS Expedition 9 (April 18 to October 23, 2004). Expedition 9 launched from the Baikonur Cosmodrome, Kazakhstan, aboard the Soyuz TMA-4 spacecraft. As the NASA space station science officer and flight engineer, Colonel Fincke spent 6 months aboard the ISS, continuing ISS science operations, maintaining station systems and performing four spacewalks. The Expedition 9 mission concluded with undocking from the station and safe landing back in Kazakhstan on October 23, 2004.

ISS Expedition 18 (October 12, 2008 to April 8, 2009). Expedition 18 launched from the Baikonur Cosmodrome, Kazakhstan, aboard the Soyuz TMA-13 spacecraft. As the ISS commander, Fincke and his three-person crew helped prepare the station for future six-person crews and hosted the space shuttle crews of STS-126 and STS-119. The Expedition 18 mission concluded with undocking from the station and safe landing back in Kazakhstan on April 8, 2009.

STS-134 (May 16 to June 1, 2011). The STS-134 mission marked the final flight of Space Shuttle Endeavour. Fincke served as mission specialist 1 on the flight deck and as one of the spacewalkers and robotics arm operators. The STS-134 crew delivered the Alpha Magnetic Spectrometer (AMS), a state-of-the-art cosmic ray particle physics detector, to the International Space Station.

Fincke has a total of 381 days, 15 hours and 11 minutes in orbit and has logged 48 hours and 37 minutes of EVA time on nine spacewalks.

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June 26-27, 2012
Denver Marriott City Center, 1701 California Street, Denver, Colorado 80202

American Astronautical Society
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