



ASGSR

2019

35th Annual Meeting of the
American Society for Gravitational and Space Research

Denver, Colorado / November 20th - November 23rd, 2019

Online program available at asgsr.org/program

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*For a more detailed and up to date view of sessions please visit:
asgsr.org/program*

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Sponsorship Levels



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A Letter from Program Chair, Anna-Lisa Paul



Dear Colleagues,

On behalf of ASGSR President Kevin Sato and the Organizing Committee, we welcome you to the 35th Annual Meeting of the American Society for Gravitational and Space Research (ASGSR), November 20th to 23rd, 2019 at the Sheraton Denver Downtown Hotel, Denver, Colorado.

We hope you find the meeting program exciting! Every year is a little different, but we always try to strike the perfect balance of scientific, technological, and educational activities. Our program comprises a broad range of symposia and workshops covering new research results and also research opportunities, in spaceflight life and physical sciences, and a wide compendium of related ground-based research.

The conference begins on November 20th, and is opened with a Plenary Lecture by Dr. Dava Newman, the Apollo Program Professor of Astronautics at MIT in Aeronautics and Astronautics. Dr. Newman is a leader in advanced space suit design, and also served as NASA's Deputy Administrator. The first day continues with the President's Symposium, which highlights both life and physical sciences research, symposia discussing space exploration policy and the Decadal Survey, plus what it takes to explore beyond LEO. We end the day with a symposium discussing the biological effects of space radiation, and then the welcome reception.

Day Two begins with a symposium focused on recent advancements in biological and physical science research on the ISS, and then in the afternoon there will be SLPSRA programmatic sessions for both life and physical sciences. These sessions are an important opportunity for us – the research community – to talk to the folks at SLPSRA about future research initiatives and grant proposal development.

Day Three begins with "Hot Topics" – diverse topics of interest to the microgravity research community, followed by the graduate and undergraduate student poster session, and then concurrent technical sessions in life and physical sciences in the afternoon.

Day Four opens with a symposium focused on research from two of our ELGRA colleagues, plus a set of shorter talks that touch on how the science of fluid physics and the water in life habitats interconnect. This symposium is followed by a panel discussion entitled Developing a Space Economy. The High School Poster session is also held before lunch. More concurrent technical sessions in life and physical sciences follow in afternoon, and then the Banquet puts a cap on the day! The Banquet speaker this year will be Dr. Kelsi Singer, the deputy project scientist for New Horizons, who will be sharing the story of exploring Pluto (still a planet in my eyes at least).

There will be plenty of other things to explore – pre-conference workshops, education events, science art, and of course the camaraderie of old friends and new.

Thanks for being a part of the 2019 meeting.

Best wishes,

Anna-Lisa Paul, 2019 Annual Meeting Chair



Tuesday, November 19th, 2019

7:00 AM - 5:00 PM
Registration

South Convention Lobby

8:00 AM - 5:30 PM
**Pre-Conference
Workshops**

AIBS Communication for ASGSR Members
TIME: 8:30 PM - 12:30 PM
LOCATION: Tower Court C

GeneLab Analysis Working Group (AWG) Showcase
TIME: 1:00 PM - 6:00 PM
LOCATION: Windows

3D Tissues and Microphysiological Systems
TIME: 1:00 PM - 6:00 PM
LOCATION: Silver, Mezzanine

12:00 PM - 6:00 PM
**Posters/Exhibit Hall
Setup**

North and South Convention Lobby

7:00 PM - 9:30 PM
ASGSR Board Meeting

Gold, Mezzanine



SHARE

The 2019 meeting with your network

#asgstr2019

Wednesday, November 20th, 2019

7:00 AM - 5:00 PM
Registration All Day-
Posters/Exhibit Hall All
Day

North and South Convention Lobby

7:00 AM - 8:00 AM
Continental Breakfast

North and South Convention Lobby

8:00 AM - 9:00 AM
Welcome, Opening
Remarks, and Plenary
Lecture

Grand Ballroom

Plenary Lecture by Dava Newman
Apollo Professor of Aeronautics and Astronautics, MIT
"Humanity Becoming Interplanetary & Climate Vital Signs Revealed"

9:00 AM - 10:30 AM
Life and Physical
Sciences Joint Sym-
posium #1: President's
Plenary Symposium

Grand Ballroom

Moderated by Kevin Sato, ASGSR President

- Multi-omic Dynamics of Human Spaceflight - Christopher Mason, Cornell University
- The Molecular Circadian Clock and Its Impact on Health and Disease: Importance for Return to the Moon and Mission to Mars - Fred Turek, Northwestern University
- Development Of Concrete Materials For Extraterrestrial Infrastructure - Aleksandra Radlinska, Penn State University

10:30 AM - 11:00 AM
Break



North and South Convention Lobby
Sponsored by: TenX Ventures

11:00 AM - 12:15 PM
Visions of Exploration

Grand Ballroom

Moderated by Anna-Lisa Paul, ASGSR Meeting Chair

- Cis-Lunar Exploration and Life Science - Jim Green, NASA HQ
- The Decadel Survey Status and Discussion:
Sandra Graham, The National Academies
Robert Ferl, University of Florida
Dava Newman, MIT

Wednesday, November 20th, 2019

12:15 PM - 2:00 PM
Lunch

On your own

12:30 PM - 1:30 PM
Standing Committee
Meeting (Journal)

Journal Committee Meeting, **Colorado, Mezzanine**

2:00 PM - 4:00 PM
Symposium #2:
Deep Space and Lunar
Exploration

Grand Ballroom

Moderated by Douglas Matson, ASGSR President Elect

- Using ISS and Lunar Platforms as Analogs for Integrated Hazards of Human Mission to Mars - Julie Robinson, NASA - ISS Division
- Gateway and Lunar Exploration - Debra Needham, NASA-MSFC
- Commercial Lunar Providers - Brad Bailey, KBR
- SLPSRA Science and Lunar Exploration - Craig Kundrot, NASA HQ

4:00 PM - 4:30 PM
Break



North and South Convention Lobby
Sponsored by: TenX Ventures

4:30 PM - 6:00 PM
Symposium #3:
Radiation

Grand Ballroom

Moderated by Lisa Carnell, NASA

- Epigenetic Effects Following Radiation Exposure - Janet Baulch, UC Irvine
- Radiation-Induced Health Effects - Sylvain V. Costes, NASA-ARC
- Chronic Neutron Radiation Exposure - Michael Weil, Colorado State
- Combined Low-Dose Radiation and Hind-Limb Unloading Research - Rupak Pathak, University of Arkansas

6:00 PM - 9:00 PM
Investigator Poster
Session

South Convention Lobby

6:00 PM - 8:00 PM
Welcome Reception

South Convention Lobby

Thursday, November 21st, 2019

7:00 AM - 5:00 PM
Registration All Day,
Posters/Exhibit Hall All
Day

North and South Convention Lobby

7:00 AM - 8:00 AM
Continental Breakfast

South Convention Lobby

8:00 AM - 10:30 AM
Symposium #4:
Recent Advancements
in Biological and Phys-
ical Science Research
on ISS

Grand Ballroom

Moderated by Kevin Sato, ASGSR President

- Using electromagnetic Levitation to Control Convection During Rapid Solidification on the ISS - Douglas Matson, Tufts University
- Plant Responses Across A Continuum Of Gravity Treatments - Chris Wolverton, Ohio Wesleyan University
- Microbial Tracking in the International Space Station - Crystal Jaing, Lawrence Livermore National Laboratory
- Declic Physics Mini-laboratory Iss Research Studies - Rémi Canton, CNES

10:30 AM - 11:00 AM
Break

North and South Convention Lobby

11:00 AM - 12:00 PM
Concurrent Technical
Sessions

Combustion 1 - **Tower Court A**
Microbes 1 - **Tower Court D**
Plants 1 - **Windows**

11:00 AM - 12:15 PM
Concurrent Technical
Sessions

Complex Fluids 1 - **Tower Court C**
Fluid Physics 1 - **Tower Court B**

12:00 PM - 2:00 PM
Lunch

On your own

12:30 PM - 2:00 PM
Standing Committee
Meeting (Education &
Outreach)

Education and Outreach Meeting, **Colorado, Mezzanine**

Thursday, November 21st, 2019

2:00 PM - 3:30 PM
SLPSRA Overview

Windows

2:00 PM - 4:00 PM
**Programmatics:
NASA SLPSRA Space
Biology**

Tower Court D

Moderated by Kevin Sato, ASGSR President

- Dr. David Tomko - Program Scientist, NASA HQ SLPSRA Division Space Biology Program
- Nicole Rayl - Program Manager, NASA HQ SLPSRA Division Space Biology Program
- Dr. Howard Levine - Chief Scientist, Utilization and Life Sciences Office, NASA Kennedy Space Center
- Dr. Craig Kundrot - Director, NASA HQ SLPSRA Division

2:00 PM - 4:00 PM
**Programmatics:
SLPSRA Division Physical
Sciences**

Tower Court C

Moderated by Kevin Sato, ASGSR President

- Dr. Craig Kundrot - Director, NASA HQ SLPSRA Division
- Dr. DeVon Griffin - Program Manager, NASA HQ SLPSRA Physical Sciences Program
- Dr. Francis Chiaramonte - Program Scientist, NASA HQ SLPSRA Physical Sciences Program
- Dr. Brad Carpenter - Program Scientist, NASA HQ SLPSRA Physical Sciences Program

4:00 PM - 4:30 PM
Break

North and South Convention Lobby

4:30 PM - 6:00 PM
**Concurrent Technical
Sessions**

Cardiovascular - **Tower Court C**
Combustion 2 - **Tower Court A**
Enabling Technologies 1 - **Tower Court B**
Humans and Development - **Tower Court D**
Plants 2 - **Windows**

6:00 PM
**Free Evening for
Networking**

On your own

Friday, November 22nd, 2019

7:00 AM - 5:00 PM
**Registration All Day,
 Posters/Exhibit Hall All
 Day**

North and South Convention Lobby

7:00 AM - 8:00 AM
Continental Breakfast

South Convention Lobby

8:00 AM - 10:00 AM
**Symposium #5:
 Hot Topics**

Grand Ballroom

Moderated by Anna-Lisa Paul, ASGSR Meeting Chair

- Epigenomic Exercise Countermeasures - Mike Snyder, Stanford University
- 3D Tissues and Microphysiological Systems - Lucie Low, NIH/CATS
- Introduction of JAXA's Electrostatic Levitation Furnace (ELF) and Recent Thermophysical Property Measurement Results of Ultra-High Melting Temperature Oxides - Hideki Saruwatari, Japan Aerospace Exploration Agency
- RAD - Characterizing the Radiation Environment on Mars - Don Hassler, Southwest Research Institute

10:30 AM - 11:00 AM
Break

North and South Convention Lobby

10:00 AM - 12:00 PM
**Undergraduate/
 Graduate Student
 Poster Session**

North and South Convention Lobby

12:00 PM - 2:00 PM
Lunch

On your own

12:30 PM - 2:00 PM
**Standing Committee
 Meeting (Meetings and
 Workshops)**

Meetings and Workshops Committee Meeting, **Colorado,
 Mezzanine**

Friday, November 22nd, 2019

2:00 PM - 4:00 PM

Concurrent Technical Sessions

Combustion 3 - **Tower Court A**
Facilities and Platforms - **Tower Court D**
Fluid Physics 2 - **Tower Court C**
Fundamental Physics - **Tower Court B**
Microbes 2 - **Windows**

4:00 PM - 4:30 PM

Break

North and South Convention Lobby

4:30 PM - 6:00 PM

Concurrent Technical Sessions

Bone and Muscle 1 - **Tower Court D**
CNS - **Tower Court C**
Complex Fluids 2 - **Tower Court B**
Microbes 3 - **Tower Court A**
Plants 3 - **Windows**

6:00 PM -

Free Evening for Networking

On your own

7:30 PM - 9:30 PM

Student Mixer



Windows Room

Sponsored by: ISS National Laboratory

Keynote by Julie Robinson,
Chief Scientist, ISS Division, HEOMD, NASA Headquarters

Saturday, November 23rd, 2019

7:00 AM - 5:00 PM
Registration All Day

South Convention Lobby

7:00 AM - 8:00 AM
Continental Breakfast

North Convention Lobby

8:00 AM - 9:00 AM
ELGRA International Collaborations

Grand Ballroom

Moderated by Anna-Lisa Paul, ASGSR Meeting Chair

9:00 AM - 10:00 AM
Concurrent Technical Sessions

Grand Ballroom

Fluid Physics - 3: 9:00 AM-9:30 AM

Plants 4 - 9:30 AM - 10:00 AM

9:00 AM - 12:00 PM
Middle/High School Poster Session

North and South Convention Lobby

10:30 AM - 12:00 PM
Developing a Space Economy Panel

Grand Ballroom

Moderated by Anna-Lisa Paul, ASGSR Meeting Chair

- Doug Comstock, NASA HQ
- Tommy Sanford, Commercial Spaceflight Federation
- Michael Roberts, ISS National Lab

12:00 PM - 2:00 PM
**Lunch/
ASGSR Board Meeting**

**Lunch on your own,
Board meeting in Gold Room, Mezzanine Level**

2:00 PM - 3:30 PM
**Meet the Scientists:
For High School and
Middle School Students**

South Convention Lobby

Saturday, November 23rd, 2019

2:00 PM - 3:30 PM

Concurrent Technical Sessions

Combustion 4 - **Tower Court B**

Enabling Technologies 2 - **Tower Court A**

2:00 PM - 3:30 PM

Genelab Open Session

Windows

"Demo: Explore How Spaceflight Alters Gene Expression Using the GeneLab Analysis Platform and Visualization Tools."

Interested in how spaceflight impacts gene expression? Curious on how you can use NASA's GeneLab platform to navigate, share, analyze, and visualize omics data?

To answer these and other questions, drop by GeneLab's working session to learn how to use the GeneLab Data System, including its new data visualization and updated analysis platform, for investigating space-relevant gene expression changes. GeneLab staff will be on-hand to demonstrate the data system and answer questions. Bring your laptops.

Presenters: Afshin Beheshti, Amanda Saravia-Butler

3:30 PM - 4:00 PM

Break

North and South Convention Lobby

4:00 PM - 5:30 PM

Concurrent Technical Sessions

Education - **Tower Court B**

Immune - **Tower Court A**

Microbes 4 - **Windows**

4:00 PM - 5:45 PM

Concurrent Technical Sessions

Bone and Muscle 2 - **Tower Court D**

Materials Science - **Tower Court C**

6:00 PM - 7:00 PM

Cash Bar Open Before Banquet

North and South Convention Lobby

7:00 PM - 9:30 PM

Awards Banquet and Keynote by Kelsi Singer

Grand Ballroom

Join us for a night with Kelsi Singer

Senior Research Scientist at Southwest Research Institute

Plenary/Banquet Keynote Bios

Dava Newman, Apollo Professor of Aeronautics and Astronautics, MIT



Dava Newman is the Apollo Program Professor of Astronautics at the Massachusetts Institute of Technology (MIT) in Aeronautics and Astronautics, a Harvard-MIT Health, Sciences, and Technology faculty member and Director of the MIT Portugal Program. Dr. Newman's research expertise is in multidisciplinary aerospace biomedical engineering investigating human performance across the spectrum of gravity. She is a leader in advanced space suit design, dynamics and control of astronaut motion, leadership development, innovation and space policy. Newman was the principal investigator on 4 spaceflight missions. The Space Shuttle Dynamic Load Sensors (DLS) experiment measured astronaut-induced disturbances of the microgravity environment on mission STS-62. An advanced system, the Enhanced Dynamic Load Sensors experiment, flew on board the Russian Mir Space Station from 1996–1998. Dr. Newman was a Co-Investigator on the Mental Workload and Performance Experiment (MWPE) that flew to space on STS-42 to measure astronaut mental workload and fine motor control in microgravity. She also developed the MICRO-G space flight experiment to provide a novel smart sensor suite and study human adaptation in extreme environments. She is the MIT PI on the Gravity Loading Countermeasure Suit, or Skinsuit, onboard the International Space Station as an ESA technology demonstration 2015-2017. Best known for her second skin BioSuit™ planetary EVA system, her advanced spacesuits inventions are now being applied to "soft suits/exoskeletons" to study and enhance locomotion on Earth. Recent research focuses on Earth Systems, namely ocean through near-space subsystems to accelerate solutions for climate and oceans by curating near-space satellite data to make the world work for 100% of humanity. Newman is the author of *Interactive Aerospace Engineering and Design*, and has published more than 250 papers in journals and refereed conferences, and holds numerous compression technology patents. She has supervised 90 graduate student theses and supervised and mentored over 200 undergraduate researchers.

She served as NASA Deputy Administrator from 2015–2017, and along with the NASA Administrator was responsible for articulating the agency's vision, providing leadership and policy direction, and representing NASA to the White House, Congress, international space agencies, and industry. Dr. Newman was the first female engineer and scientist to serve in this role and was awarded the NASA Distinguished Service Medal. She championed the human journey to Mars, technology and innovation, and education. Her National Academies service includes membership on the Space Studies Board, two terms on the Aeronautics Space and Engineering Board, the Committee on Human Spaceflight Technical Panel, and a discipline panel on the Decadal Survey on Biological and Physical Sciences in Space. Recent honors include: Lowell Thomas Award, Phi Beta Kappa Visiting Scholar, AIAA Fellow, AIAA Jeffries Aerospace Medicine and Life Sciences Research Award, and Women in Aerospace Leadership Award. She holds a Ph.D. in aerospace biomedical engineering from MIT, M.S. degrees in aerospace engineering and technology and policy from MIT, and a B.S. in aerospace engineering from the University of Notre Dame.

Kelsi Singer, Senior Research Scientist at Southwest Research Institute



Dr. Kelsi Singer is a Senior Research Scientist at Southwest Research Institute in Boulder, CO and Deputy Project Scientist on the New Horizon's mission. Dr. Singer received her PhD at Washington University in St. Louis where her thesis focused on the geology and geophysics of icy satellites of Jupiter, Saturn, and Neptune. She studies the Pluto-system, the Kuiper belt, and impact cratering across the solar system. We look forward to her discussion of science: LEO, the moon, and beyond.

Concurrent Sessions

Thursday - 11:00AM-12:00PM

Combustion - 1

Tower Court A

- Radiative and kinetic extinction of gaseous spherical diffusion flames in microgravity, Phillip Irace, Washington University in St. Louis
- Microgravity Experiments Examining Electric Field Effects on Laminar Methane Gas-Jet Diffusion Flames, Yu-Chien Chien, University of California, Irvine
- Experimental Study on Sooty Coflow Flames in Microgravity., Jesse Tinajero, Yale University
- Flammability of PMMA solid fuel spheres in microgravity at reduced oxygen and purely forced flow, the effect of solid preheating, Michael Johnston, Universities Space Research Association

Complex Fluids - 1

11:00-12:15 Tower Court C

- Nanoplate Liquid crystals in External Fields, Zhengdong Cheng, TAMU
- Diffusing Wave Spectroscopy: Decoupling physical phenomena in concentrated systems, James Ferri, Virginia Commonwealth University
- Temperature-gradient-induced thermomigration in thin, tethered smectic liquid crystal bubbles in microgravity, Chel Park, University of Colorado
- Ferromagnetic nematic colloidal LC droplets in isotropic background, Xi Chen, University of Colorado Boulder

Fluid Physics - 1

11:00-12:15 Tower Court B

- Prediction of Microgravity Flow Boiling Heat Transfer, Caleb Hammer, U. of Maryland
- Influence of detection strategy on the performance of whole-field planar optical diagnostics for thermometry in the ZBOT experiment, Manoochehr Koochesfahani, Dept of Mechanical Engineering, Michigan State University
- Data-driven Magnetohydrodynamic modeling on Electromagnetically Levitated Molten Droplet, Xiao Xiao, German Aerospace Center (DLR)
- Zero-Boil-Off Tank (ZBOT) Experiment – CFD Model Validation, Mohammad Kassemi, NASA Glenn Research Center
- Modeling of Marangoni corner flow with phase change in the constrained vapor bubble system, Vladimir Ajaev, Southern Methodist University

Microbes - 1

Tower Court D

- Effects of spaceflight and low-shear modeled microgravity on pathogen virulence, Rachel Gilbert, NASA Ames Research Center
- Instrumentations to support International Space Station "omics" capabilities, Kasthuri Venkateswaran, Jet Propulsion Laboratory
- MANGO: Microbiome Analysis of NASA GeneLab Omics, Nitin Singh, NASA-JPL-Caltech
- Nanosatellites for in situ microbiology in space, Wayne Nicholson, University of Florida

Plants - 1

Windows

- VEG-04: The Effects of Light Quality on Mizuna Mustard Growth, Nutritional Composition, and Organoleptic Acceptability for a Space Diet, Gioia Massa, NASA
- New perspectives for watering substrate-based root modules in microgravity in the Advanced Plant Habitat (APH), Oscar Monje, Kennedy Space Center
- Does seed sanitization influence the bacterial community of crop plants exposed to potential pathogens?, Christina Khodadad, AECOM Management Services, Inc.
- Astro Garden™ Large-Scale Microgravity Crop Growth System, Robert Morrow, Sierra Nevada Corporation

Cardiovascular

Tower Court C

- Long-term Simulated Microgravity Accelerates Vascular Aging in Hindlimb Unweighted Rats, Jiaxin Zhang, School of Aerospace Medicine, The Fourth Military Medical University
- Long-term hindlimb unloading impaired left ventricular function and mechanical synchronization, Changyang Xing, The Fourth Military Medical University
- Simulated Microgravity Induces Sex Differences in Aortic Stiffness in Middle Aged Rats, Liliya Yamaleyeva, Wake Forest School of Medicine
- Simulated weightlessness alters cardiomyocyte structure and transcriptional regulation of mediators related to immunity and cardiovascular disease, Candice Tahimic, NASA Ames Research Center/KBR
- Deciphering functional & physiological mechanism regulates cardiomyocytes derived from hiPSCs in response to altered gravity conditions., Aviseka Acharya, Student"

Combustion - 2

Tower Court A

- Multi-component jet fuel surrogate droplet combustion: Preferential vaporization behaviors under spray relevant conditions and effects on combustion behaviors, Tanvir Farouk, University of South Carolina
- Multidimensional Simulation of Cool Flame Droplet Combustion Under Laminar Flow Conditions, Sudipta Saha, University of South Carolina
- A Study of Calibration Transportation Fuels from the Perspective of Spherical Droplet Flames, Jordan Brunson, Cornell University
- Precision Measurement of Droplet Diameter from Digital Video Images of Soot-producing Fuels, Anthony Reeves, Cornell University
- Two-stage autoignition dynamics of n-dodecane droplets under normal gravity at high pressures, Vedha Nayagam, Case Western Reserve University

Enabling Technologies - 1

Tower Court B

- Blood transcriptomic diagnostic capability on ISS, Cassandra Juran, Universities Space Research Association (USRA)
- The Role of Quiescence in Uniform Protein Crystal Growth after Homogeneous Nucleation, Paul Todd, Techshot, Inc.
- Cross Kingdom analysis of data within the GeneLab repository identifies a potential conserved response of life to the stress associated with spaceflight, Richard Barker, UW Madison
- A multidisciplinary modeling approach of plant gas exchange in reduced gravity environments, Lucie Poulet, NASA Kennedy Space Center
- Developing high-throughput organ-on-a-chip models to investigate the effects of ionizing radiation on the central nervous system, Sherina Malkani, Blue Marble Space at NASA Ames Research Center
- GeneLab : The NASA Systems Biology Platform for Space Omics Repository, Analysis and Visualization, Sylvain Costes, NASA Ames Research Center

Enabling Technologies - 1

Tower Court B

- Blood transcriptomic diagnostic capability on ISS, Cassandra Juran, Universities Space Research Association (USRA)
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- GeneLab : The NASA Systems Biology Platform for Space Omics Repository, Analysis and Visualization, Sylvain Costes, NASA Ames Research Center

Humans and Development

Tower Court D

- RR-4 experiment: epigenetic events in mice' testes and duct deference, Irina Ogneva, SSC RF IBMP RAS
- Circulating miRNA Signature Predicts Health Risks Associated with Radiation and Microgravity, Afshin Beheshti, NASA Ames Research Center
- Using DNA damage to investigate the individual variability of human sensitivity to ionizing radiation, Eloise Pariset, NASA Ames Research Center
- Mitochondrial driven metabolic alterations inferred from GeneLab database as mediators of spaceflight health risks, Afshin Beheshti, NASA Ames Research Center
- Micro-11: Microgravity Significantly Alters Human and Bovine Sperm Functions on the ISS, Joseph Tash, University of Kansas Medical Center, Department of Molecular and Integrative Physiology, and GametBio, LLC
- Effects Of Mission-Relevant Doses Of Sep/Gcr Radiation On Human Hematopoietic And Gi Systems, Christopher Porada, Wake Forest Institute for Regenerative Medicine"

Plants - 2

Windows

- Using Brachypodium distachyon to Investigate Monocot Plant Adaptation to Spaceflight, Patrick Masson, Laboratory of Genetics, University of Wisconsin-Madison
- Brassinolide Inhibits Autotropic Root Straightening through Partial Disruption of the Actin Cytoskeleton, Elison Blanco-flor, Noble Research Institute LLC
- Time and Space; The interaction of the circadian clock and gravitropic responses, Colleen Doherty, North Carolina State University
- Are membrane contacts between the vacuole, ER and amyloplasts important for plant gravitropism?, Marcela Rojas-Pierce, North Carolina State University
- Changes in Plants Developed from Dry Seeds Irradiated by Simulated Galactic Cosmic Radiation, Ye Zhang, NASA-Kennedy Space Center
- Adaptation of plant transcriptional profile to Moon and Mars g-levels on board SEEDLING GROWTH spaceflight experiment, Raúl Herranz, Centro de Investigaciones Biologicas (CIB-CSIC)

Combustion - 3

Tower Court A

- Investigation on thermodynamics of ethanol hydrothermal flames using Raman spectroscopic measurements, Jun Kojima, Ohio Aerospace Institute
- Comprehensive chemical kinetic mechanism for simple hydrocarbon fuels including important excited and charged species, Claudia-Francisca Lopez-Camara, University of California at Irvine
- Supercritical Water Oxidation (SCWO) – Investigation of Hydrothermal Flames and Their Potential Role in Advanced SCWO Reactor Design, Michael Hicks, NASA - Glenn Research Center
- Fire Whirls in Microgravity, Sriram Bharath Hariharan, University of Maryland, College Park
- Flammability of clothing and food packaging used in spacecraft at normoxic conditions, Fletcher Miller, San Diego State University
- The influence of surface configuration of an immersed metal element to pool fire burning, Xiaoyue Pi, Worcester Polytechnic Institute
- Numerical Simulation of Liquid Oxygen Droplet Combustion in Hydrogen in Microgravity, James Hermanson, University of Washington, Seattle
- Liquid Oxygen Droplet Combustion in Hydrogen under Microgravity Conditions, Christian Eigenbrod

Facilities and Platforms

Tower Court D

- Designing Research for Blue Origin's New Shepard Spacecraft, Erika Wagner, Blue Origin
- BioChip SubOrbital Lab: An Autonomous Microscopy and Microfluidic Suite to Observe Transient Processes Throughout a Suborbital Flight, Devin Ridgley, SCORPIO-V: A Division of HNu Photonics
- Payload Testing on New Suborbital Vehicles, Kathryn Hurlbert, NASA Johnson Space Center
- DoD Space Test Program Experiment Integration onto ISS, Carolyn Conley, Space Test Program-Houston
- BioFabrication Facility, Tissue Printing on the International Space Station, Eugene Boland, Techshot, Inc.
- Microgravity Simulation Support Facility for Space Research, Ye Zhang, NASA-Kennedy Space Center
- SpaceShipTwo: A Suborbital Vehicle for Human Spaceflight and Microgravity Research, Sirisha Bandla, Virgin Galactic
- Weighing Rodents and Plants in the Microgravity Environment, John Wetzel, Sierra Nevada Corporation

Fluid Physic - 2

Tower Court C

- Vibration of Heated Wires Due to Nucleate-Boiling-Induced Flow, Alexander Yarin, University of Illinois at Chicago
- Flow Boiling and Condensation Experiment (FBCE) for the International Space Station, Issam Mudawar, Purdue University
- Study of passive cyclonic two-phase separator for space applications, Yeyuan Li, Case Western Reserve University
- A new model for predicting flow boiling critical heat flux in microgravity, Chirag Kharangate, Case Western Reserve University
- Flow Boiling and Condensation Experiment Flight Hardware Development, Henry Nahra, NASA Glenn
- Flow Boiling in Horizontal Channel with Upward and Downward Facing Heated Surfaces Encompassing Gravity to Inertia Dominated Regimes, Henry Nahra, NASA Glenn
- Generalized Single-phase and Two-phase Flow Heat Transfer Correlations for Cryogenic Fluids, Issam Mudawar, Purdue University
- A CFD Model For Variable Conductance Heat Pipe, Cho-Ning Huang, Case Western Reserve University

Fundamental Physics

Tower Court B

- The German Microgravity Program in Physical Sciences, Thomas Driebe, DLR Space Administration
- Dusty Plasma Experiments under Microgravity Conditions, John Goree, Department of Physics and Astronomy, The Univ. Of Iowa
- High Rate Receiver for the Deep Space Quantum Link, Sandrine Ferrans, Georgia Institute of Technology
- Direct detection of chameleon and symmetron dark energy in microgravity, Sheng-Wey Chiow, Jet Propulsion Laboratory
- The Coolest Spot in the Universe: A Facility for Cold Atom Experiments Aboard the ISS, Jason Williams, JPL
- Investigating the Thermal Properties of a Complex Plasma, Lori Scott, Auburn University

Microbes - 2

Windows

- Bacillus subtilis biofilm formation under simulated microgravity – a multi-methodological approach, Ralf Möller, DLR - German Aerospace Center
- Staphylococcus capitis subsp. capitis ISS isolate as a model organism for evaluating antimicrobial surfaces within the upcoming space flight experiment BIOFILMS, Katharina Siems, DLR German Aerospace Center
- Verification of the Design of a Bacterial Biofilm Experiment in Preparation for Spaceflight, Diana Pamela Flores Ayuso, BioServe Space Technologies
- Characterization of E. faecalis isolated from the ISS and the genes required for survival in the space radiation environment, Noelle Bryan, MIT
- Subjecting Mycobacterium marinum to Low Shear Modeled Microgravity in Biofilm-Promoting Media Increases Growth and Transcripts Related to Biofilm Production., Lynn Harrison, LSU Health Sciences Center
- Low shear modeled microgravity accelerates bacteria-induced development in the squid-vibrio symbiosis via the up-regulation of extrinsic and intrinsic pro-apoptotic elements, Jamie Foster, University of Florida
- The influence of spaceflight on the astronaut salivary microbiome and the search for a microbiome biomarker for viral reactivation, Camilla Urbaniak, Jet Propulsion Laboratory

Bone and Muscle - 1

Tower Court D

- Intracellular Viscosity in Conditions of Hypergravity in Bone and Endothelial Cells, Jack Van Loon, VU University Amsterdam
- Damage to the Menisci and/or Knee Articular Cartilage in Mice after Spaceflight: RR-9 and STS-135 Results, Jeffrey Willey, Wake Forest School of Medicine
- Delineation of Simulated Microgravity Derived Bone Constructs (Hfob), As a Potential Biomaterial For Human Bone-Tissue Engineering Application., Vivek Mann, Texas Southern University
- Deletion of CDKN1a/p21 sensitizes bone marrow stem cells to proliferative and differentiative mechanotransductive mechanisms., Cassandra Juran, Universities Space Research Association (USRA)
- Microgravity deleteriously effects micrometer length scale features in mouse bone in a site- and age-dependent manner, Jennifer Coulombe, University of Colorado Boulder
- Expression Profile of Cell Cycle-related Genes in Human Fibroblasts Exposed Simultaneously to Radiation and Simulated Microgravity, Akihisa Takahashi, Gunma University Heavy Ion Medical Center

CNS

Tower Court C

- Spaceflight impacts on neurovascular remodeling and BBB integrity., Xiao Wen Mao, Loma Linda University
- How does space flight influence the biology of human neural stem cells?, Araceli Espinosa-Jeffrey, IDDRRC-UCLA
- Simulated microgravity affects behavior and cytokine expression in the hippocampus of adult mice: influence of mitochondrial reactive oxygen species, Linda Rubinstein (Guttmann), NASA Ames Research center, USRA
- Investigating neuro-consequences of spaceflight using Drosophila melanogaster, Janani Iyer, NASA/USRA
- Evaluating effects of altered gravity on the nervous system using D. melanogaster, Siddhita Mhatre, University of New Mexico/FILMSS

Complex Fluids - 2

Tower Court B

- Electric Field-Driven Structuring in Polarized Colloids, Boris Khusid, New Jersey Institute of Technology
- Reconfigurable Colloidal Chains for Multimodal Propulsion, Ning Wu, Colorado School of Mines
- Crystallization of hard-sphere colloids at large particle volume fractions, Boris Khusid, New Jersey Institute of Technology
- Crystallization of hard-sphere colloids at large particle volume fractions, Boris Khusid, New Jersey Institute of Technology
- Colloidal Suspensions for Probing Glass Transitions at the Single-particle Level, Chandan Mishra, Department of Physics and Astronomy
- Impacts of Temperature on the Stability of Colloidal Suspensions using the Nanoparticle Haloing Mechanism, Gerold Willing, University of Louisville

Microbes - 3

Tower Court A

- Use of EM-1 biological return samples of Chlamydomonas reinhardtii to optimize biofuel production and astronaut radiation risk., Timothy Hammond, Department of Veterans Affairs
- Irradiation Ground Control for a Genome-Wide Yeast Fitness Profiling Experiment On Board Orion's Artemis 1 Mission, Corey Nislow, University of British Columbia
- Investigating Biological Responses to Space-like Radiation using the yeast Saccharomyces cerevisiae, Lauren Liddell, NASA Ames Research Center
- Effects of Space Flight on Radiation-Tolerant Fungi, Jason Wood, NASA-JPL
- Experimental evolution of Bacillus subtilis 168 in the spaceflight environment, Craig Everroad, NASA Ames Research Center
- Contributions of the gas environment to Candida albicans adaptations to spaceflight, Sheila Nielsen, Montana State University

Plants - 3

Windows

- RNAseq Pathway Analysis of *Arabidopsis thaliana* grown in conditions of microgravity onboard the International Space Station., Joshua Vandenbrink, Louisiana Tech University
- The transcriptome of *Arabidopsis* grown on the ISS reveals evidence of hypoxia and a role for ROS-based signalling in the stresses of spaceflight, Richard Barker, UW Madison
- Selecting for *Chlamydomonas reinhardtii* fitness in a liquid algal growth system on the International Space Station, A. Mark Settles, University of Florida
- Conserved plant transcriptional responses to microgravity from two consecutive spaceflight experiments., Imara Perera, North Carolina State University
- Investigation of Spaceflight Environment Effects on Differentially Expressing Lignin and Carbon Capture Pathways in *Arabidopsis* Using Integrated Omics Methods, Kim Hixson, Pacific Northwest National Laboratory
- Patterns of gene expression in *Arabidopsis thaliana* in response to microgravitational environment, Erik Hanschen, Los Alamos National Laboratory

Concurrent Sessions

Saturday - 9AM and 2PM Sessions

9:00AM-10:00AM

Fluid Physics - 3

Grand Ballroom

- Study of the Geometric Scaling Effects on a DYNASWIRL® Phase Separator, Gregory Loraine, Dynaflow, Inc.
- Comparison of the Gravitational Strain Magnitudes Induced into Organisms Rotating with the Earth with the Magnitudes Experienced During Motion in Low Earth Orbits, Steve Thorne, The Copernican Project.org

Plants - 4

Grand Ballroom

- Plant Water Management in Microgravity, Tyler Hatch, NASA GRC
- Early Prototype Development of the Passive Orbital Nutrient Delivery System (PONDS)., Howard Levine, NASA Utilization and Life Sciences Office, Kennedy Space Center, FL

2:00PM-3:00PM

Combustion - 4

Tower Court B

- An Experimental Study of the Effect of Inclination on Opposed-Flow Flame Spread, Subrata Bhattacharjee, SDSU
- Scaling and Analytical Modeling of Low Pressure Stagnation Flames on PMMA Rods, Paul Ferkul, USRA
- Concurrent-Opposed Flame Spread Reversal Phenomenon for Ultra-Thin Solid Samples, Ya-Ting Liao, Case Western Reserve University
- Overview of the Planned Solid Materials Flammability Experiments in the ISS/KIBO by FLARE Project, Masao Kikuchi, Japan Aerospace Exploration Agency
- Solid Fuel Ignition and Extinction (SoFIE) Project on ISS, Paul Ferkul, USRA

Enabling Technologies - 2

Tower Court A

- The Importance of Planetary Protection in Interplanetary Mission Design, Tristan Caro, CU Boulder
- BioNutrients-1, on-demand production of nutrients in space, Aditya Hindupur, KBR/NASA Ames Research Center
- Flexible Imaging Platform for Suborbital Studies, Jordan Callahan, University of Florida
- A consistent sample and data processing pipeline to improve interpretability of spaceflight RNAseq data, Jonathan Galazka, NASA Ames Research Center
- Biological CubeSats: what have we learned so far and what is next?, Sergio Santa Maria, NASA ARC / UNM
- Effect of macromolecular mass transport in microgravity vs 1G protein crystallization, Arayik Martirosyan, University of Hamburg

Bone and Muscle - 2

4:00-5:45 **Tower Court D**

- A Moderate Daily Dose of Resveratrol Mitigates Muscle Deconditioning in Rats Exposed to a Martian Gravity Analogue, Marie Mortreux, Harvard Medical School - Beth Israel Deaconess Medical Center
- Altered myosin ATPase activity appears to be protective of muscle function in microgravity, Anjali Gupta, SBP Medical Discovery Institute
- Articular and sternal cartilage respond differently to 30 days of microgravity, Jamie Fitzgerald, Bone and Joint Center, Henry Ford Hospital
- The Presence of the Hut enrichment in the NASA Rodent Habitat in 1g Ground Testing is Associated with Bone microCT Structural Changes Suggestive of Disuse, Eduardo Almeida, NASA Ames Research Center
- Molecular Muscle Experiment 2, Nathaniel Szewczyk, University of Nottingham
- CDKN1a/p21 plays a critical role in suppressing stem cell regenerative potential during aging and altered mechanical load, Margareth Cheng-Campbell, Rensselaer Polytechnic Institute
- Social isolation impacts select responses to simulated weightlessness, Candice Tahimic, NASA Ames Research Center/KBR"

Immune

Tower Court A

- Bone Marrow Antibody Repertoire Responses after Vaccination in a Mouse Spaceflight Model, Trisha Rettig, Loma Linda University
- A Multi-Omics Approach Demonstrates that Spaceflight Leads to Lipid Accumulation in Mouse Livers, Afshin Behesh-ti, NASA Ames Research Center
- Investigating cellular and tissue responses to chronic low dose gamma irradiation using ⁵⁷Co plates, Sherina Malkani, Blue Marble Space at NASA Ames Research Center
- Effects of Environmental Endotoxins and Microgravity on Normal Human Lymphocytes: Role of ETAS as an Immunomodulation Therapy: Implications for Moon and Mars missions, Maitreyi Chaganti, Texas Southern University
- Modeled microgravity induces neutrophil extracellular trap (NET)osis formation and reduced phagocytosis of polymorphonuclear neutrophils, Amber Paul, NASA ARC and USRA
- Effects on Anti-Leukemic Activity of Human Natural Killer Cells in a Continuous Microgravity Environment, Bradford Kuhlman, Wake Forest Institute for Regenerative Medicine

Materials

4:00-5:45 **Tower Court C**

- Formulation of Yttria-Stabilized Zirconia Aerogels for High Temperature Applications, Rebecca Walker, Virginia Commonwealth University
- Electrostatic levitation experiments in ISS for interfacial tension measurements between iron melt and molten oxide -INTERFACIAL ENERGY Project-, Masahito Watanabe, Gakushuin University
- Determination of surface tension using higher-order modes of levitated liquid droplets, Nevin Brosius, University of Florida, Department of Chemical Engineering
- DECLIC EVO: repair, upgrade, and new science objectives, Rémi Canton, CNES
- Effect of mass evaporation on measurement of liquid density of Ni-based super alloys using ground and space levitation techniques, Jannatun Nawer, Tufts University
- Simulating the oscillation of multiphase droplet using coupled Cahn-Hilliard-Navier-Stokes equations, Jonghyun Lee, Iowa State University
- Investigation of molten metal oxides in microgravity using the JAXA ELF instrument on ISS, Richard Weber, Materials Development, Inc.

Microbes - 4

Windows

- Results of the Micro-12 Flight Experiment: Effects of Microgravity on *Shewanella oneidensis* MR-1, Michael Dougherty, KBR
- Validation of the Portable International Space Station Smart Sample Concentrator for Microbial Monitoring of Potable Water Samples, Ceth Parker, Jet Propulsion Laboratory
- Initial Microbial Tracking 2 results reveal bacterial exchange between astronauts and the International Space Station, Michael Morrison, Lawrence Livermore National Laboratory
- Microbiological profile of multi-species leafy greens grown simultaneously in the Veggie vegetable production systems on ISS, Mary Hummerick, AECOM

Undergrad/Graduate Student Posters

SP001	Effects of clinorotation on the growth and development of WT strains of Arabidopsis - Alena Jones, University of North Carolina at Greensboro
SP002	Genome methylation in germ tissues of mice under anorthostatic suspension - Maria Usik, SSC RF IBMP RAS
SP003	The 2D Clinostat Does Not Simulate Microgravity for Phototropism Studies - Megan Toler, UNCG
SP004	Evaluating the role of the circadian clock in plant responses to microgravity - Kaetlyn Ryan, North Carolina State University
SP005	Design, Prototyping, and Testing of a Novel Flowpath With an Array of six 3D Matrix Vitro Bioreactors for the NASA Bioculture System - Kristin Ma, Blue Marble Space Institute of Science
SP007	13 days of microgravity exposure lower bone formation rates and bone maturation rate in growing C57BL/6N mice - Bhavya Senwar, Mechanical Engineering; University of Colorado
SP008	
SP009	Prenatal hypergravity exposure alters placental expression of stress-related genes - SIMRANJIT KALOTIA, NASA Ames Research Center
SP010	BioSentinel: Optimizing yeast preparation for long-duration spaceflight missions - Elizabeth Hawkins, University of Maryland, Baltimore County
SP011	Characterization of Radiotolerance Mechanisms in the Tardigrade Species <i>Hypsibius dujardini</i> - Ben Cooper, NASA Ames Research Center - KBR
SP012	Electrochemical CO ₂ Conversion to Enable Biomanufacturing - Ava V. Karanjia, KBR/NASA Ames Research Center
SP013	Effects of normalization methods on downstream analysis of spaceflight gene expression data - Mikayla Buckley, NASA Ames Research Center - KBR
SP014	Experiments of Dust Mitigation for Moon and Mars Exploration - Benjamin Farr, LASP
SP015	Clemson University
SP016	Comparing C3 and C4 microgreen CO ₂ usage, water uptake, and nutritional value to optimize resources on the space station and improve dietary needs of crew members - Samantha Rueckels, North Carolina State University
SP017	Gravity as a continuum: Effects of Altered Gravity on <i>Drosophila melanogaster</i> Immunity - Joe Olivieri, NASA Space Life Sciences Training Program
SP018	Low-gravity capillary flows in complex conduits: spontaneous bubble formation, confinement, and liberation - Phoebe Wall, Stanford
SP019	Ames Research Center - KBR
SP020	Using whole genome sequencing to assess the effects of spaceflight on the mouse gut microbiome - Taylor Walton, NASA Ames Research Center--KBR
SP021	3D-Printed Random Positioning Machine (RPM) - Shane Grover, NASA Ames Research Center
SP022	NASA Ames Research Center
SP023	Effects of Low-shear Modeled Microgravity on <i>Serratia marcescens</i> Pathogenesis - Nicole Tanenbaum, NASA Space Life Sciences Training Program (SLSTP)
SP024	Methylation pattern determination in the genome of <i>Bacillus pumilus</i> strain SAFR-032 - Bianca Serda, Jordan McKaig, Space Life Science Training Program, KBR, NASA Ames Research Center
SP025	THE ROLE OF AHA2 IN THE INTERFACE OF GRAVITROPISM AND PHOTOTROPISM - Ava G. Heller, Ohio University
SP028	The Effects of Simulated Lunar and Martian Gravities on the Growth and Morphology of <i>Escherichia coli</i> , <i>Shewanella oneidensis</i> , Methicillin-Resistant
SP029	Searching for Components of the Non-Statolith Gravity Sensing System in Plants - Chris Wolvert, Ohio Wesleyan University
SP030	Understanding the Effects of Gravity on the Combustion of Thin PMMA in a Narrow Channel Apparatus - Lucas Massey, San Diego State University
SP031	Spaceflight influences gene expression, photoreceptor integrity, and oxidative stress-related damage in the murine retina - Eliah G. Overbey, University of
SP032	Two Different Approaches for Opposed-Flow Flame Spread Experiments - Luca Carmignani, San Diego State University
SP033	Faraday resonance over a corrugated surface: theory and experiments - Nevin Brosius, University of Florida, Department of Chemical Engineering
SP034	Microgravity Experiments - Karthekeyan Sridhar, Graduate Student
SP035	Growth of microorganisms in a space-bioreactor analog - Joe Adam, Rensselaer Polytechnic Institute
SP036	Ultraviolet light measurements (280 to 400 nm) acquired from stratospheric balloon flight to assess influence on bioaerosols - Tristan Caro, CU Boulder
SP037	RNA sequencing reveals differences in gravitropic response between WT Arabidopsis and the "starchless" <i>pgm1</i> mutant - Alexander Meyers, Ohio University
SP038	Nitric Oxide Takes Center-stage in Gravitropic Response and Reveals Possible Signaling Mechanisms in Arabidopsis thaliana - Colin P.S. Kruse, Ohio University
SP039	Hydrogel-based "transparent soils" for root phenotyping in vivo - Lin Ma, Iowa state University
SP040	Towards confinement-stabilized colloidal suspensions using a horizontally rotated microfluidic system. - Md Mahmudur Rahman, University of Louisville
SP041	In situ Mass Spectrometric Analysis of Spaceflight Effects on Xyloglucan Composition of Arabidopsis thaliana Root Cell Walls - Brandon Califar, University of Florida
SP042	Single Cell Expressome Sequencing of Gravity Mechanostimulated Progenitor Stem Cells Versus Differentiated Embryoid Bodies, Selectively Promotes Proliferation and Suppresses Cell Cycle Arrest on Embryoid Bodies - Molly Coyne, NASA Ames Research Center
SP043	Influence of the Circadian Clock on the Arabidopsis Gravitropic Response - Joseph Tolsma, North Carolina State University
SP044	Embedded Contactless Sensor System for Enhancing in-situ Physiochemical Analytical Capabilities on Icy-moons - Chinmayee Govinda Raj, Student
SP045	An automated behavioral analysis of <i>Drosophila melanogaster</i> in spaceflight - Jhony A. Zavaleta, Blue Marble Space Institute of Science
SP046	Competition or Cooperation? Leveraging plant-plant interactions for optimal water use efficiency - Souvik Banerjee, Iowa State University
SP047	Effects of simulated microgravity growth on <i>Streptococcus mutans</i> physiology - Ke Aira Davis, University of Florida
SP048	The influence of low shear modeled microgravity on <i>Staphylococcus aureus</i> growth and physiology - Matthew Hauserman, University of Florida
SP049	Production of Bioelectricity using simulated space crew waste under microgravity conditions - Abhilash Kumar Tripathi, South Dakota School of Mines and Tech
SP050	Mice exposed to combined chronic low-dose irradiation and modeled microgravity develop long-term neurological sequelae - Eliah G. Overbey, University of Washington
SP051	An Optical Study of 3-Phase Contact Line on Silicon Surface - Anisha Pawar, Rensselaer Polytechnic Institute
SP052	Infrared Measurements of Forward Heat Conduction during Simulated Microgravity Flame Spread in the NCA - Michael Berry, San Diego State University
SP053	Circadian Rhythm Maintenance in Two Mouse Strains During Spaceflight - Katrina Campbell, Northwestern University
SP054	Human Energy Expenditure, Physical Activity, and Cortisol Responsivity in Extreme Environments - Mallika S. Sarma, University of Notre Dame
SP055	Effect of Microgravity on Enzyme Kinetics of Purified Enzymes - Shailabh Rauniyar, South Dakota School of Mines & Technology

Investigator Posters

IN1	Greensboro
IN2	Modelling Leaf Temperatures during Parabolic Flights - Nathan N. Barkdull, Department of Physics, University of Florida
IN3	NASA INSTITUTIONAL SCIENTIFIC COLLECTION (ISC) - Danielle Lopez, NASA Ames / Life Science Data Archive
IN4	Queen's University Belfast
IN5	Analysis of Stress Levels and Blood Flow in a Rat Partial Gravity Analogue - Dr Marie Mortreux, Harvard Medical School - Beth Israel Deaconess Medical Center
IN6	Increased Chromosome Aberrations in Cells Exposed Simultaneously to Simulated Microgravity and Radiation - Megumi Hada, Prairie View A&M University
IN7	Using Low-Speed 2-Dimensional Clinorotation -to study gravi-sensitivity in Arabidopsis and Brachypodium - Shih-Heng Su, Laboratory of Genetics, University of Wisconsin, Madison, WI, USA
IN8	Identification of the roles of Arabidopsis thaliana Calmodulin-Like 24 (CML24) in Regulating Plant Flooding and Low-Oxygen Responses Under Ground and Flight Conditions - Arkadipta Bakshi, University of Wisconsin-Madison
IN9	Technologies, LLC
IN10	Targeting the Roots of Cotton Sustainability - Sarah J. Swanson, University of Wisconsin - Madison
IN11	Technologies
IN12	Novel partial weight bearing model leads to dose-dependent skeletal deficits in rats - Frank Ko, Harvard Medical School - Beth Israel Deaconess Medical Center
IN13	How does water delivery system design impact the microbial load of salad crops? - Aaron Curry, Aecom - LASSO
IN14	Plant-Microbial Metatranscriptomic Analysis for Spaceflight Application - Natasha Sng, University of Florida
IN15	Space Center
IN16	Immunocytochemistry of cell wall polysaccharides of Arabidopsis thaliana seedlings grown in microgravity analogs - Jin Nakashima, Noble Research Institute, LLC.
IN17	Effects of long-term spaceflight on the murine gut microbiome: a strain comparison - Peng Jiang, Northwestern University
IN18	Comparative analysis of the virulence of starved and non-starved Pseudomonas aeruginosa isolates in animal models - Tesfaye Belay, Bluefield State College
IN19	Glenn Research Center
IN20	TOAST3: A discovery environment to explore multiple plant biology spaceflight experiments. - Richard Barker, UW Madison
IN21	University
IN39	Effects of Light Quality on Radish growth - Susan John, University of Louisiana at Lafayette
IN22	The Potential Negative Effects of Microgravity on Human Cartilage - Richard Meehan MD., National Jewish Hospital
IN40	Microgreens for Human Nutrition in Spaceflight - Dr. Christina Marie Johnson, PhD, NASA Postdoctoral Program
IN23	Plant-on-a-Chip Platform for Secondary Metabolites - Münire Ekmekçigil, PhD, Izmir Biomedicine and Genom Center
IN41	STRUCTURAL HEALTH MONITORING OF NANOCOMPOSITE MATERIALS FOR SPACESUIT APPLICATIONS WITH ELECTRICAL RESISTANCE TOMOGRAPHY - Dr. Valeria La Saponara, University of California- Davis
IN24	yuri GmbH - democratizing microgravity - Christian Bruderrek and Maria Birlem, yuri GmbH
IN25	NASA GeneLab Computomics Reveal Horizontal Gene Transfer on International Space Station Environmental Metagenomes - Nicholas Bense, NASA Ames Research Center
IN26	BioSentinel: NASA's first interplanetary bio CubeSat - Sergio R. Santa Maria, NASA ARC / UNM
IN27	University
IN28	Inc.
IN29	Investigation of link between Zebrafish cataract formation from exposure to galactic cosmic radiation and 137Cs gamma-rays - Jack Higginbotham, Oregon State University
IN30	Research Center
IN42	Effects of the ISS spaceflight environment and lignin reductions on plant anatomy and gas diffusion in leaves - Margaret Turpin, University of New Mexico
IN43	University of New Mexico
IN31	Does the microbiome of crop plants differ by species? - Cory J. Sperrn, AECOM
IN32	Adapting Microbial Experimental Evolution Methods for Microgravity Studies - Diana Gentry, NASA Ames Research Center
IN33	Melanized fungi as a model to investigate mechanisms of resistance and adaptation to ionizing radiation - Jillian Romsdahl, National Research Council Postdoctoral Research Associate
IN34	Iowa State University
IN35	Ekoplasma - A next generation complex plasma space experiment - U. Konopka, Auburn University
IN36	Osteoblastogenesis optimization in the Bioculture System and use of slow-release growth factor beads for Cell Science-03 - Margareth Cheng-Campbell, Rensselaer Polytechnic Institute
IN37	Dynamics of Burner-Generated Spherical Diffusion Flames in Microgravity - Stephen Tse, Rutgers University
IN38	Matrix-Assisted Laser Desorption/Ionization (MALDI) Image Analysis of Microgravity-Exposed Mice Brain Proteome from the International Space Station - Correy Vigil, United States Air Force



Gravitational and Space Research is the peer reviewed, open access journal of the American Society for Gravitational and Space Research.

Information on submission and instructions to authors for GSR can be found on the journal's web site:

GravitationalAndSpaceResearch.org

Also available on the web site are a template in Word, and an EndNote™ style file. GSR is an open access, peer re-viewed journal which is indexed with Google Scholar, EB-SOhost, and is under review with MedLine and Thomson-Reuters. Due to its open access format, content can also be found just by typing search terms into any web browser search engine. There are no Open Access Fees.

Submission is open to all. Research topics include – but are not limited to – gravitational and space biology, astrobiology, analog environment research, advanced life support (ALS), biophysics, radiation biology, hard-ware engineering and development, fluid physics, materials science, combustion science, and acceleration in altered gravity environments. The categories of papers include Short Communication, Methods, Research, Hypothesis and Review.

We look forward to receiving many high-quality papers that strongly reflect the exciting research of our members. We are the face of ASGSR.

Dr. Jamie Foster, Editor in Chief

ASGSR Art Competition



ASGSR Art Competition!

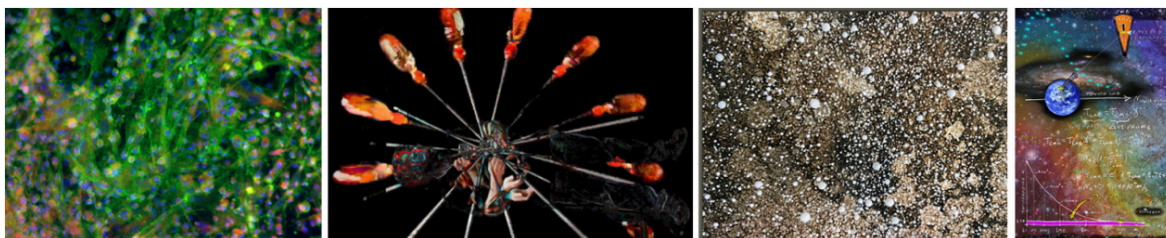
Again this year the conference will have an art competition. Voting will take place outside the Grand Ballroom where the art will be placed. Entries will be displayed during the conference and a democratic vote will be taken to determine the winners. Awards will be given for both Artistic Merit and Technical Merit categories. Submissions will be evaluated based on their artistic merit and/or technical merit, and there will be awards for both categories.



Eligible entries include (but are not limited to): images (photographs or computer-generated), paintings, drawings, or sketches of gravitational and space research phenomena. Rearrangement, assembly, or other creative mixing of images into an art-form is appropriate and encouraged. Last year's winning art entries are shown above.

Each registered attendee will receive an art ballot as part of the registration package. The peer voting will occur throughout the conference until 3 PM Saturday. We plan to announce the winners before at the banquet that evening. We encourage you to submit an entry and look forward to a very successful event.

Place your vote today!



ASGSR Standing Committees

JOURNAL COMMITTEE

Chair: Jamie Foster

The Journal Committee prepares and solicits articles relevant to ASGSR interests for ASGSR publications and other journals, including international publications, as well as providing technical reviewers upon request. The journal committee supports outreach activities that promote the advancement of gravitational and space.

At minimum, the Journal Committee should annually:

- Solicit input and assemble the articles for ASGSR publications, including the ASGSR refereed journal.
- Provide an editor(s) for ASGSR publications.
- Promote the Society's publications, including providing access to the publications for Society members through the website.
- Provide guidance with regards to the evolution of ASGSR publications.
- Facilitate the promotion of ASGSR authored articles to the general public and lay press.
- Provide input for the ASGSR newsletter and website.

Note: All ASGSR members are welcome to attend and serve on the Journal Committee.

Agenda Items to discuss:

1. Update on the transfer to Sciendo and the ScholarOne Manuscript submission portal
2. Update on the 2019 submissions and metrics
3. Strategies to increase submission rate by ASGSR members
4. Additional journal team members needed: more active Associate Editors and perhaps a production team member to help coordinate accepted papers with Sciendo.
5. Making the journal more visible to members.
6. Two years left on Sciendo contract, what will be our metrics of success for the journal.

EDUCATION AND OUTREACH COMMITTEE

Chair: Gioia Massa

If creating educational opportunities for emerging scientists is your interest, consider joining this committee. The Education and Outreach Committee promotes and conducts education activities (student poster and design competitions) and can develop specific projects to increase knowledge and awareness of gravitational space and research throughout ASGSR sponsored public and professional forums. Annually, ASGSR supports the Graduate and Undergraduate Student Poster Competition at the annual meeting. This committee would be responsible for coordination and administration of the competition.

At minimum, the Education and Outreach Committee should annually:

- Coordinate participation in the ASGSR student poster competition including promoting event and recruiting student competitors.
- Organize and select judges for the ASGSR student poster competition. The student poster competition includes cash awards that are pre-determined annually.
- Update slide sets on ASGSR Web site.
- Develop and coordinate outreach event(s) for the annual meeting. (E.g., high school participation)

Agenda Items to discuss:

1. Introductions
2. Approval of Minutes from 2018
3. Review of topics of interest at the 2019 Meeting:
4. Updates from ASGSR involvement at International Astronautical Congress.
5. Competition updates – Drop Tower, Ken Souza Suborbital, any others in work
6. Updates and new business

MEETINGS AND WORKSHOPS COMMITTEE

Chair: Anna-Lisa Paul

Do you have new ideas for workshops, sessions or symposiums for the 2017 meeting? If so, we encourage you to participate with the meetings and workshops committee. The Meetings and Workshops Committee is responsible for assisting the conference chair in organizing technical sessions for the ASGSR annual meeting. The ASGSR past president serves as the Program Chair for the Annual Meeting. Each year, this committee will work with Program Chair to identify the technical program. The committee will also work with the ASGSR board of governors to identify candidate geographic locations for the annual meeting. The committee also identifies other venues for ASGSR technical participation, such as the AIAA Aerospace Sciences Meeting (ASM), ELGRA, and ISGP. If other venues are identified, the committee submits a short proposal to the ASGSR board of directors, and executive director for approval, especially if there is an anticipated expenditure of funds. The committee will coordinate with other conference committees for joint sponsored conferences, co-located meetings, and workshops.

At minimum, the Meetings and Workshops Committee should annually:

- Assist the Program Chair in organizing technical sessions for the ASGSR annual meeting
- Seek and coordinate joint venue activities at other conferences (e.g., ASM, ELGRA, ISGP) that promote gravitational and space research.

MEMBERSHIP/COMMUNICATIONS COMMITTEE

Chair: Dr. Kevin Sato

The Membership/Communications Committee recruits qualified new individuals who wish to promote gravitational and space biology and related technology development. Overall, the committee works to enhance ASGSR membership, working closely with the executive administrator, who maintains the membership database. The committee will work to keep balanced membership across organizations and fields of expertise and ensure that current members remain sufficiently active in ASGSR. In addition to planning recruitment of new members, the committee will develop and implement a plan to re-engage past members.

Furthermore, the committee supports outreach activities that promote the advancement of gravitational and space biology. The committee also assists in the publication of the ASGSR quarterly newsletter. This committee can also coordinate the development of position or white papers (also a role for the external affairs committee). The ASGSR Web site will be monitored by the committee, with a member(s) designated as content manager.

At minimum, the Membership/Communications Committee should annually:

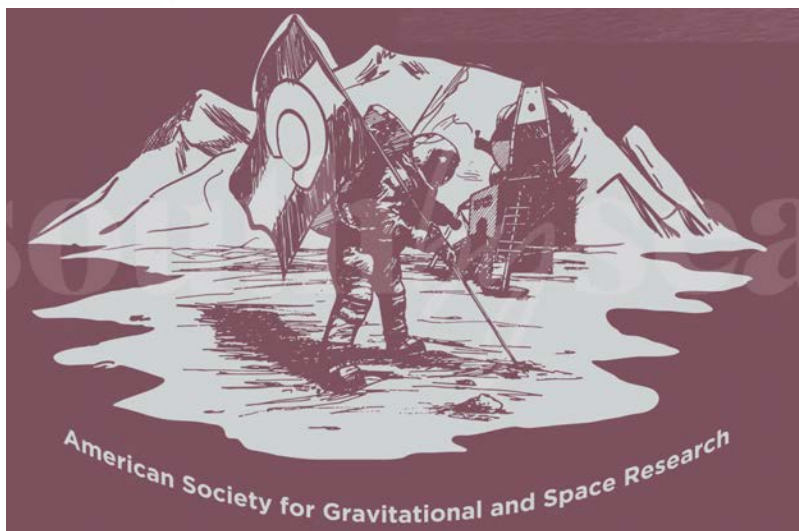
- Monitor member participation (meetings, voting and committee membership).
- Recruit new members (including international and student members) and follow up with welcome letters and information.
- Work with the Nominating Committee (standing committee) to identify candidates for the board of directors and president-elect.
- Solicit input and assemble the articles for ASGSR website and newsletter.
- Promote the Society's publications, including providing access to the publications for Society members through the website.
- Annually update and prepare the ASGSR membership-marketing brochure and make it available to membership committee and members to distribute at appropriate events.
- Provide content updates for the ASGSR Web site as needed.
- Assist in the publication of the ASGSR newsletter.
- Facilitate the promotion of ASGSR authored articles to the general public and lay press.

ASGSR Students

JOIN THE ASGSR STUDENT BOARD!

The student board of the American Society for Gravitational and Space Research is holding elections! Join our student board to plan and participate in educational outreach events, policy advocacy trips to Washington D.C., social media representation, student conference events and opportunities, and more. Open positions include Vice President (President Elect), DC Trip coordinator, Merchandise Coordinator, Web and Social Media Chair, and Educational Outreach chair. Students can learn more about positions and their current holders at www.asgsrcstudents.org. For further questions or to express interest in running for a position, please email Esther Putman at esther.putman@colorado.edu

Throughout the conference the student board will be selling merchandise, including these official 2019 ASGSR Denver T-Shirts.
Stop by and say hello!

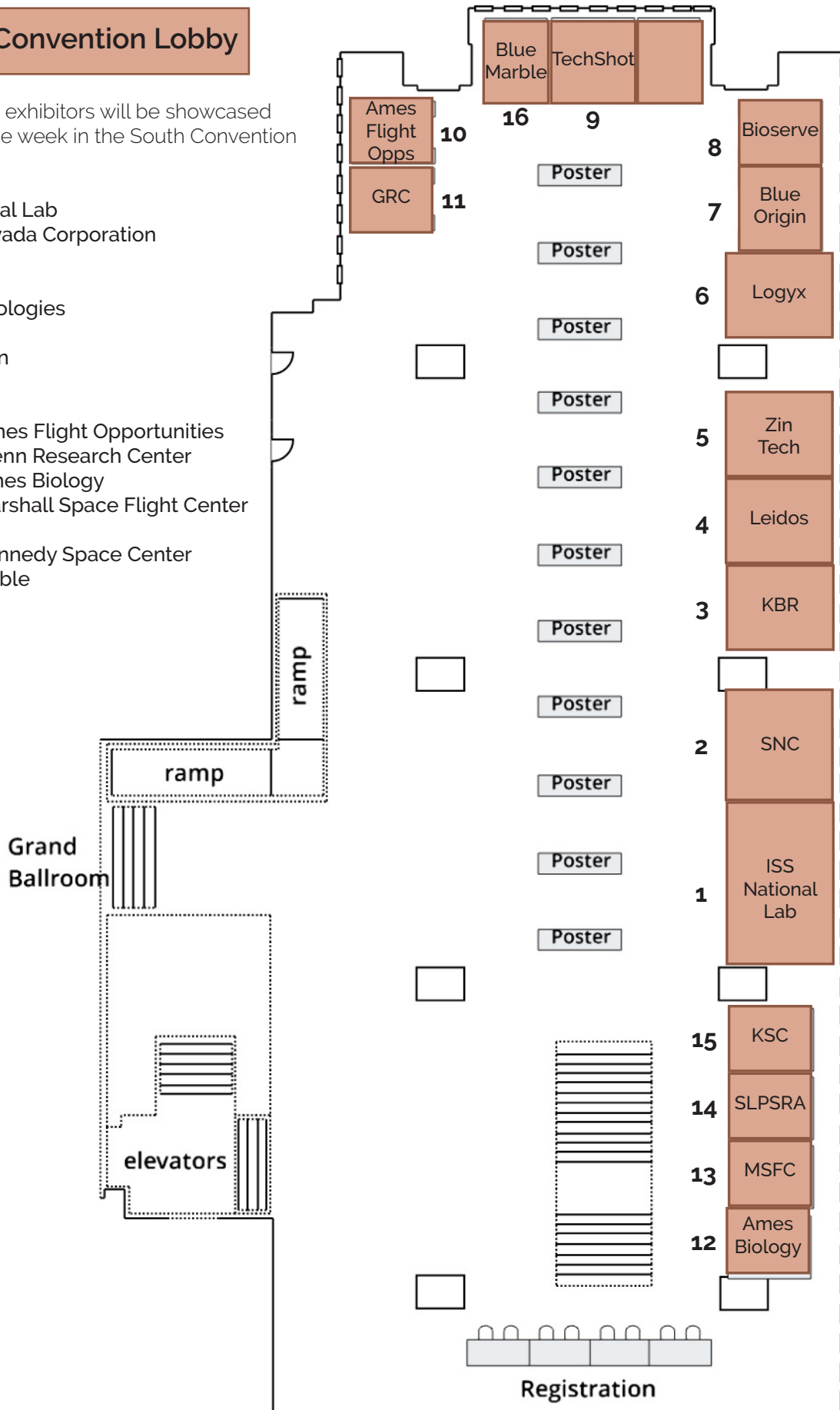


2019 ASGSR Exhibitors

South Convention Lobby

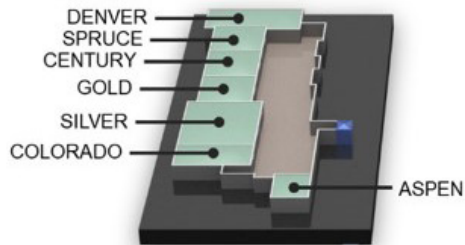
The following exhibitors will be showcased throughout the week in the South Convention Lobby:

- 1 - ISS National Lab
- 2 - Sierra Nevada Corporation
- 3 - KBR
- 4 - Leidos
- 5 - Zin Technologies
- 6 - Logyx
- 7 - Blue Origin
- 8 - Bioserve
- 9 - TechShot
- 10 - NASA Ames Flight Opportunities
- 11 - NASA Glenn Research Center
- 12 - NASA Ames Biology
- 13 - NASA Marshall Space Flight Center
- 14 - SLPSRA
- 15 - NASA Kennedy Space Center
- 16 - Blue Marble

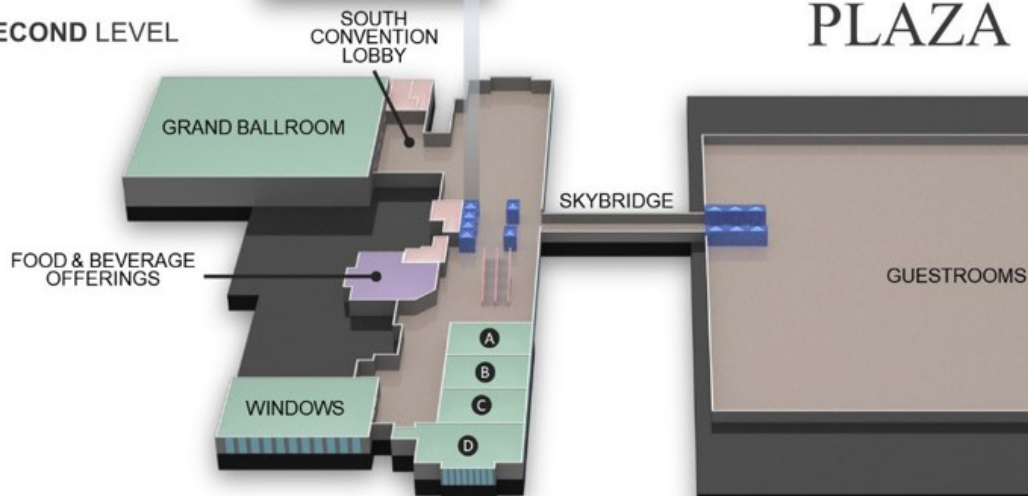


TOWER

MEZZANINE LEVEL

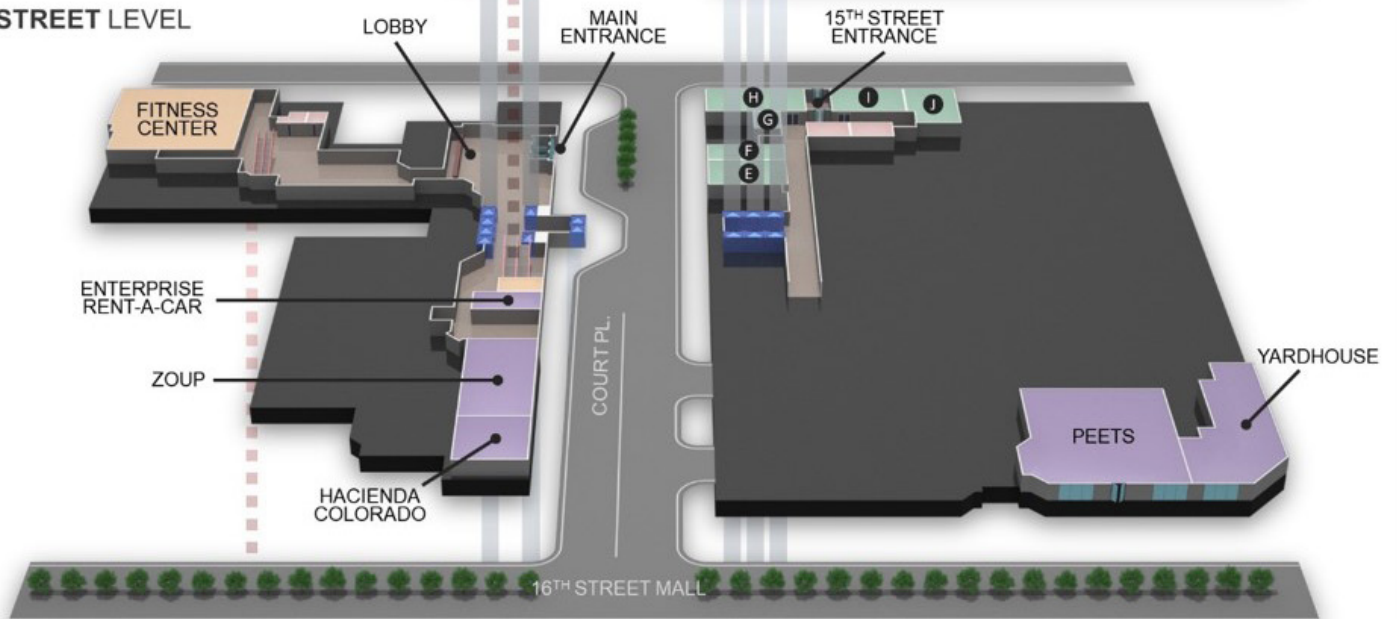


SECOND LEVEL

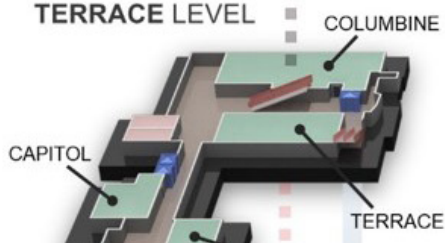


PLAZA

STREET LEVEL



TERRACE LEVEL



CONCOURSE LEVEL



ASGSR Remembers:
Bill Atwell, 1939-2019
Jim Guikema, 1951-2018

ASGSR
2019



Artwork for the 2019 ASGSR program was provided by the winners of the 2018 ASGSR Art Competition.

Front:

“Ring of Gyres”

Tyler Hatch (NASA GRC)
Hunt Hawkins (NASA GRC)
John Mcquillen (NASA GRC)
David Chao (NASA GRC)
Mark Weislogel (Portland State University)

Back:

“The Return of Life”

Hsin Chuan Pan (UCLA)
Jiayu Shi Pin Ha (UCLA)
Yulong Zhang (UCLA)
Lloyd Baik (UCLA)
Jin Hee Kwak (UCLA, Yonsei University)
Kang Ting (UCLA)