



30TH ANNUAL
FELLOWSHIP SYMPOSIUM
 UTAH NASA SPACE GRANT CONSORTIUM
 6 MAY 2024



held at
SALT LAKE COMMUNITY COLLEGE
WESTPOINTE CAMPUS
 WORKFORCE TRAINING & EDUCATION BUILDING
 1060 N. FLYER WAY; SALT LAKE CITY, UT 84160

8:00-8:30 AM **Registration** – sign in and pick up materials

8:45 AM **Welcome and Introductions**

- **Dr. Joseph Orr, Director, Utah Space Grant Consortium**
- **Dr. Jonathan Barnes, Associate Dean, Division of Natural Science and Engineering, Salt Lake Community College**

All participants meet together at 8:45 a.m. in Room 102 - we will break into concurrent sessions in Rooms 131, 133, and 215/217 for presentations beginning at 9:00 AM

Session 1 **Session Chair: Dr. Todd Moon, Utah State University**
 9:00 AM – 9:50 AM

WWTE Rm 131

- 9:00 AM **James Hyland** (Todd Moon), *Utah State University*
 Target Position and Velocity Estimation Using Doppler Information from Wi-Fi Signals
- 9:10 AM **Ivy Running** (Spencer Magleby), *Brigham Young University*
 Kirigami Pattern Development for Gossamer Reflectarray Antenna
- 9:20 AM **Katie Varela** (Spencer Magleby), *Brigham Young University*
 Demonstration of Self-Deploying and Self-Stabilizing Behaviors in Origami-Inspired Arrays
- 9:30 AM **Noah Langenfeld** (Bruce Bugbee), *Utah State University*
 Nitrification Rate Depends on Nitrogen Fertilizer Source in Root-Zones for Bioregenerative Life-Support
- 9:40 AM **Dallan Trentman** (Steve Gorrell), *Brigham Young University*
 Extracting Meanline Modeling Parameters for Radial Turbomachinery from CFD

Session 2 **Session Chair: Dr. Kai Kuck, University of Utah**
 9:00 AM – 9:50 AM

WWTE Rm 133

- 9:00 AM **Lars Lofgren** (Kai Kuck), *University of Utah*
 The Rule of Monitoring the Partial Pressure of Oxygen in Urine for Early Detection of Acute Kidney Injury
- 9:10 AM **Savanah Turner** (Denise Stephens), *Brigham Young University*
 A Survey of Model Fits to Brown Dwarf Spectra Through the L-T Sequence
- 9:20 AM **Kyle Jackson** (Yu Huang), *Utah State University*
 Expedited Cellular Uptake of Hydrophobic Antioxidants for Oxidative Stress Mitigation via F127 Micelle Encapsulation

9:30 AM **Collin Andersen** (Hong Yong Sohn), *University of Utah*
Production of Steel from Lunar Regolith Through Carbonyl Iron Refining (CIR)

9:40 AM **Marcus Behling** (Matt Allen), *Brigham Young University*
Planning MIMO Vibration Tests Using a Modal Framework

Session 3 **Session Chair: Dr Christian Hearn, Weber State University**
9:00 – 9:50 AM

WWTE 215/217

9:00 AM **Matthew Finger** (Christian Hearn), *Weber State University*
Reference Channel Optimization in Bistatic & Passive Radar

9:10 AM **Camille Cowan** (Jani Radebaugh), *Brigham Young University*
Quantitative Analysis of Terrestrial Caldera Shape and Applications in Planetary Geomorphology

9:20 AM **Kaylee Tanner** (Gus Williams), *Brigham Young University*
Earth Observation Satellite Data Reveals Correlations Between Temperature, Turbidity, and Chlorophyll-a in Utah Lake

9:30 AM **Nathan Welker** (Daniel Maynes), *Brigham Young University*
Estimating the Full Pressure Field Immediately Downstream from a Propeller Using Stereoscopic PIV

9:40 AM **Eric Larsen** (Som Dutta), *Utah State University*
Precise Impulse Design for Hybrid Rockets using Machine-Learning Informed Digital Throttle Input

POSTER SESSION *Posters presented by students and student teams with Q&A*

WWTE Rm 102/

9:55 AM – 10:45 AM

First Floor Hallway

BRIGHAM YOUNG UNIVERSITY

Bennett Graff (Richard Fry), *Brigham Young University*
Microgravity Mobility: Redesigning Footwear and Itravehicular Activity Infrastructure for Space Stations

SALT LAKE COMMUNITY COLLEGE

Isaac Bentley (Jonathan Barnes), *Salt Lake Community College*
RR Lyrae Variable Star Light Curves as Audible Sound

Jacob Best (Jonathan Barnes), *Salt Lake Community College*
RR Lyrae Variable Stars from the Gaia DR3 Dataset in the Palomar 5 Stream

Alix Elliston (Lane Law), *Salt Lake Community College*
Urine Supplementation of *NOSTOC MUSCORUM* in MGS-1 Media

Lonnie Ernst (Lane Law), *Salt Lake Community College*
Sustainability of Cyanobacteria in a CO₂ Rich Environment

Jordan Gertino (Lane Law), *Salt Lake Community College*
Establishing a Common Framework for Triangles

Olivia Harrison (Lane Law), *Salt Lake Community College*
Enhancing Bioluminescence

David Huish and Jane Lee (Lane Law), *Salt Lake Community College*
Identifying Secondary Metabolites in Corals of the Order Corallimorpharia for Novel Medicinal Use

Izen Longhurst (Jonathan Barnes), *Salt Lake Community College*
Exploring Using DR3 RR Lyrae Photometry to Determine Extinction in the Native Gaia Bandpasses

Brent Racker Jr. (Jonathan Barnes), *Salt Lake Community College*
RR Lyrae Variable Metallicities in Globular Clusters with Known Multiple Stellar Populations

Antonio Ruiz (Lane Law), *Salt Lake Community College*
Chemical Synthesis of Aerogel Fabric under Standard Lab Conditions

Luis Valdez (Lane Law), *Salt Lake Community College*
Assessing Mycorrhizal Influence on Heat-Stressed Poplar VOC Blends

Erik Wykstra (Jonathan Barnes), *Salt Lake Community College*
Historical El Nino/La Nina Patterns in Salt Lake City

SNOW COLLEGE

Daniel Schaugaard (Bryant Jones), *Snow College*
Molecular Dynamics Simulations for Molten Salt Mixtures

UTAH VALLEY UNIVERSITY

Mikaela Cowles (Joseph Jensen), *Utah Valley University*
The First SNAP Surface Brightness Fluctuation Distances

Tyler Daynes (Vern Hart), *Utah Valley University*
A High-Volume Flow Cytometer for Potential Early Detection of Bloodborne Cancer Cells

Chloe Guerrero (Christian Draper), *Utah Valley University*
Investigation of Changes in Emission Lines from Galaxies Through Time

Alexander Gibb (York Young), *Utah Valley University*
Power Scaling a Nd:YVO₄ Laser

Sydney Holt and Mikaela Cowles (Joseph Jensen), *Utah Valley University*
Correcting Surface Brightness Fluctuation Distances for Stellar Populations

Micah Laing and Ben Holt (York Young), *Utah Valley University*
Characterization of an Acousto-Optic Modulator for Implementation in a Q-switched Nd:YVO₄ Laser

Brianna Merila (Ben Coughenour), *Utah Valley University*
Mapping Accretion Around the Black Hole X-ray Binary MAXI J1803-298 with Reflection

Tessa Miller, Connor Stong, and Benjamin Miera (Phil Matheson), *Utah Valley University*
Building a Langmuir Probe

Brayden Roberts (Joshua Lothringer & Denise Stevens), *Utah Valley University*
Atmospheric Modeling of Brown Dwarfs With PICASO, SONORA, and JWST

Brian Seamons (Joshua Lothringer), *Utah Valley University*
What if WASP-39b was Twice as Hot? A JWST Transmission Spectrum of Ultra-Hot Jupiter WASP-178b

Jeremy Tait (Vern Hart), *Utah Valley University*

An Image Stitching Technique for Increased Resolution in Holographic Reconstructions

Seth Stringham and Audrey Elison (Dustin Shipp), *Utah Valley University*

Graphene Characterization with 785 nm Raman Spectroscopy

UTAH TECH UNIVERSITY

Cristina De La Vieja Medina (Samuel Tobler), *Utah Tech University*

Optimization of Animal Hair Preparation for Scanning Electron Microscopy (SEM)

WEBER STATE UNIVERSITY

Jade Marchant, Matt Wilkinson, and Gaige Jordan (John Armstrong), *Weber State University*

Wok the Line: Searching for the Hydrogen 21cm Emission

Eden Saxton, Jade Marchant, and Matt Wilkinson (John Armstrong), *Weber State University*

Testing the Limits: Characterizing the ability of the KTPO telescope to observe exoplanetary transits

WESTMINSTER UNIVERSITY

Brooks Hawkes (Bonnie Baxter), *Westminster University*

Artemia in Space

Amanda Lee (Bonnie Baxter), *Westminster University*

Ecological Dynamics of the Hypersaline Great Salt Lake North Arm

Max Lynch (Julia Kamenetzky), *Westminster University*

White Light Observations of the Total Solar Eclipse

Alivia Preston (Bonnie Baxter), *Westminster University*

Exploring Microbialite Mats of Great Salt Lake

Quincy Stewart (Julia Kamenetzky), *Westminster University*

Analysis of Total Solar Eclipse Images

TEAM POSTERS

BRIGHAM YOUNG UNIVERSITY

NASA'S BREAKTHROUGH, INNOVATIVE, AND GAME-CHANGING (BIG) IDEA CHALLENGE TEAM (Nathan Usevitch),
Brigham Young University

James Wade, Chris Paul, Simon Charles, Ashleigh Cerven, Isaac Weaver, Logan Yang, and Ashleigh Cerven

Lunar Untethered Modular Inflatable Robot

BYU MARS ROVER TEAM (Mark Killpack), *Brigham Young University*

Spencer Stowell, Jackson Harwood, Mihai Stanciu, Aaron Thomas, and Ethan Smith

BYU Mars Rover Team's Design for the University Rover Challenge

BYU ROCKETRY HIGH POWER TEAM (David Fullwood), *Brigham Young University*

Scott Tuley, Riley Brown, Aidan Rice, and Nathan Butler

BYU Rocketry's Alta: 2024 IREC & Spaceport America Cup

BYU ROCKETRY HIGH POWER TEAM (David Fullwood), *Brigham Young University*

Scott Tuley, Riley Brown, Aidan Rice, and Nathan Butler

2023 IREC & Spaceport America Cup: 1st Place in the 10,000 foot commercial motor category and overall winner of the Spaceport America Cup

UTAH STATE UNIVERSITY

USU GET-AWAY SPECIAL TEAM (Jan Sojka & Reyhan Baktur), *Utah State University*
Carter Page, Tyler Day, Ethan Wayland, and Lorenzo High
Progress on the Optically Transparent Antenna Payload for the GASRATS CubeSat

AGGIE AEROVIEW'S TRANS-AMERICAN HIGH-ALTITUDE BALLOON TEAM (Som Dutta), *Utah State University*
Jared Wallace, Kaeden Teague, Spencer Anderson, Mason Anderson, Wade Palmer, Chris Harker
Aggie AeroView's Trans-American High-Altitude Balloon

USU ROCKET TEAM (Joel Ellsworth), *Utah State University*
Nathan Schwemmer, Hayden Stout, Wyatt Lane, Jonathan Sedgwick, Mary Bergquist, Gavin Morgenegg, and
Patrick Merighe
USU 2024 Spaceport America Cup Rocket

UNIVERSITY OF UTAH

NASA'S BREAKTHROUGH, INNOVATIVE, AND GAME-CHANGING (BIG) IDEA CHALLENGE TEAM (Hong Yong Sohn),
University of Utah
Collin Andersen, John Otero, Olivia Dale, Christian Norman, Cole Walker, Jason Sheets, Talon Townsend, Julianna Ortiz,
Olivia Siane
Production of Steel from Lunar Regolith through Carbon Iron Refining (CIR)

UTAH STUDENT ROBOTICS TEAM (Mark Minor), *University of Utah*
Chandler Millar, Andrew Tolton, Daniel Robinson, Najman Husaini, Nathaniel Bruns, Brycen Cheney, Jacob Wilson,
Samuel Friel, Wyatt Jones, Joseph Youngblood, Leah Smock, Anthony Bolda, Vincent Banh, Carlos Carvajal, Ethan Larsen,
Kwinten Hale
Lunar Landscaping – Designing a Berm-Building Robot for NASA Lunabotics

Session 4 **Session Chair: Dr. Tim Berk, Utah State University****WWTE 131****10:50 AM – 11:30 AM**

- 10:50 AM **Ryan Lewis** (Tim Berk), *Utah State University*
Novel Apparatus for Studying the Effect of Gravity on the Dynamics of Particle Laden Flows
- 11:00 AM **Rhett Parry** (Tim Berk), *Utah State University*
Optimizing Turbulence Generation for Studying the Dynamics of Particle Laden Flows
- 11:10 AM **Hunter Pruett** (Spencer Magleby), *Brigham Young University*
Constant-Thickness Accommodation by Pattern Modification for Origami Flashers
- 11:20 AM **Chase Oliphant** (Steve Gorrell), *Brigham Young University*
Determining the Exit State of Centrifugal Pumps and Compressors

Session 5 **Session Chair: Dr. Lara Brewer, University of Utah****WWTE 133****10:50 AM – 11:30 AM**

- 10:50 AM **Mitch Skinner** (Larry Howell), *Brigham Young University*
Developing Membrane Hinges to Enable Predictable and Reliable Arrays for Spacecraft
- 11:00 AM **Trey Blackwell** (Joseph Orr), *University of Utah*
Evaluation of Clinical Features of Venturi Adapters for CPAP in Procedural Sedation
- 11:10 AM **Nonnie Bash** (Benjamin Boizelle), *Brigham Young University*
Discovering What Cannot Be Seen: Dust Attenuation Modeling in Early-Type Galactic Nuclei
- 11:20 AM **Nathan Coleman** (Larry Howell), *Brigham Young University*
Creating Models of Inter-Panel Slipping in Rolled Gossamer Arrays

Session 6 **Session Chair: Dr. Cammy Peterson, Brigham Young University****WWTE 215/217****10:50 AM – 11:30 AM**

- 10:50 AM **Mark McDonald** (Cammy Peterson), *Brigham Young University*
Chemical Herding: Using Chemical Reactions to Steer Colloidal Particles
- 11:00 AM **Dylan Nelson** (Elizabeth Vargis), *Utah State University*
Modeling the Effects of Retinal Thinning and Oxidative Stress During Space Travel
- 11:10 AM **Jared Payne** (Stephen Schultz), *Brigham Young University*
Expanded Fabrication of Terahertz Metal Mesh Filters
- 11:20 AM **Kira Brooks** (David Allred), *Brigham Young University*
Investigation of Poly (olefin sulfone) Depolymerization and Its Dust Mitigation Abilities for Potential Use on Spacecraft

Wrap-up, Lunch, & Tours**WWTE 102****Lunch: SSB 232-236**

- 11:30 AM Networking and visiting industry tables
- 11:50 AM Feedback, wrap up, discussion of longitudinal tracking and evaluation surveys
- 12:00 PM Lunch combined with UNSGC Trustees and Deputy Trustees
- 1:00 PM Tours (*optional*) of WWTE building and workforce training labs, meet back in WWTE 102 area