23RD ANNUAL
FELLOWSHIP SYMPOSIUM
UTAH NASA SPACE GRANT CONSORTIUM
8 MAY 2017
held at
WEBER STATE UNIVERSITY
TRACY HALL SCIENCE CENTER, ROOMS TY 232 & TY 363

8:30-9:00 a.m. **Registration –** sign in and pick up materials

9:00 a.m. **Welcome and Introductions – Dr. Joseph Orr, Space Grant Director**

All participants meet in TY 232 at 9:00 a.m. and then will break into dual sessions for presentations at 9:10 a.m.

***Sessions I/II and III/IV will be dual sessions**:*
Sessions I & III held in Tracy Hall Sci Center, Room 232
Session II & IV held in Tracy Hall Sci Center, Room 363

Session I — Session Chair: Dr. Joseph Orr, University of Utah
Tracy Hall Science Center, Room TY 232

9:10 a.m. **Orrin Pope** (Douglas Hunsaker), *Utah State University*
The Aerodynamic Center of Inviscid Airfoils

9:22 a.m. **Allison Lee** (Julie Crockett), *Brigham Young University*
Internal Wave Generation in the Presence of a Turning Depth

9:34 a.m. **Sean Ermer** (Joseph Orr), *University of Utah*
Detecting Low Respiratory Rates using Myriad, Low-Cost Sensors

9:46 a.m. **Thomas Wall** (Aaron Hawkins), *Brigham Young University*
Lab-on-a-Chip Biosensor for Interplanetary Life Detection Missions

9:58 a.m. **Jackson Reid** (Douglas Hunsaker), *Utah State Universit*y
Implementation of OpenFOAM for Inviscid, Incompressible Aerodynamic Flows

10:10 a.m. **Sean Flynn** (Parris Egbert), *Brigham Young University*
An Efficient Linear Octree-Based Grid Toward Magnetic Fluid Simulation

Session II — Session Chair: Dr. David Geller, Utah State University
Tracy Hall Science Center, Room TY 363

9:10 a.m. **Gregory Wilson** (JR Dennison), *Utah State University*
Hemispherical Grid Retarding Field Analyzer Redesign for Secondary Electron Emission Studies

9:22 a.m. **Tate Fanning** (Steven Gorrell), *Brigham Young University*
A Numerical Study of the Development of Inducer Backflow

9:34 a.m. **Kyle Burk** (Joseph Orr), *University of Utah*
Testing an Oxygen Demand Delivery Device

9:46 a.m. **Stanley Fujimoto** (Mark Clement), Brigham Young *University*
Learning the Language of Genes: Representing Global Codon Bias via Deep Language Models

9:58 a.m. **Arun Bernard** (David Geller), *Utah State University*
Simultaneous Two-Site Photometry in Attitude Determination of Resident Space Objects

10:10 a.m. **Matthew Cannon** (Michael Wirthlin), *Brigham Young University*
Targeting SRAM FPGA Components Using a Two-Photon Absorption Laser

Poster Session & Break *TY Atrium, 2nd floor, 10:22-10:48 a.m.*

Posters list on next two pages

Session III Session Chair: Dr. Kai Kuck, University of Utah
Tracy Hall Science Center, Room TY 232

10:48 a.m. **Kimberly Stevens** (Brian Iverson), *Brigham Young University*
An Optical-based Aggregate Approach to Measuring Condensation Heat Transfer

11:00 a.m. **Charles Harding** (Elizabeth Vargis), *Utah State University*
Comparison of Alginate Hydrogel and Microcarriers for *In Vitro* Modeling of Microgravity-Induced Muscle Atrophy

11:12 a.m. **Charlotte Lewis** (Paul Farnsworth), *Brigham Young University*
Desorption Electrospray Ionization (DESI) Mass Spectrometric Imaging of Spatially Regulated *In Vivo* Metabolic Rates

11:24 a.m. **Kathryn Dallon** (Brian Mazzeo), *Brigham Young University*
Acoustic Measurements of Lithium-Ion Battery Electrode Films

11:36 a.m. **Kausik Chatterjee** (Robert Schunk), *Utah State University*
A Hydrodynamic Model for Plasmasphere Refilling Following Geomagnetic Storms

11:48 a.m. **Patrick Kolbay** (Kai Kuck), *University of Utah*
Using Activated Charcoal to Reuse Anesthetic Gas

Session IV Session Chair: Dr. Steven Turley, Brigham Young University
Tracy Hall Science Center, Room TY 363

10:48 a.m. **Benjamin Brownlee** (Brian Iverson), *Brigham Young University*
Electrochemical Sensing with High Aspect Ratio Carbon Nanotube Platforms

11:00 a.m. **Erica Crampton** (Spencer Magleby), *Brigham Young University*
Considering Manufacturability in the Design of Deployable Origami-Adapted Mechanisms

11:12 a.m. **Trevor Landeen** (Jacob Gunther), *Utah State University*
Towards Unsupervised Deep Learning Based Anomaly Detection

11:24 a.m. **Paula Johnson** (Steven Charles), *Brigham Young University*
Linking Quantitative Motor Assessments to the Underlying Brain Injury: A Preliminary Report

11:36 a.m. **Tara Bishop** (Sam St. Clair), *Brigham Young University*
Using Hotspot Analysis and Detection of Early Season Invasives (DESI) to Analyze the Temporal and Spatial Dynamics of Invasive Cheatgrass (*Bromus tectorum*)

Poster Session & Break *TY Atrium, 2nd floor, 10:22-10:48 a.m.*

Bonnie Andersen & Cyrill Slezak, *Utah Valley University*
STEM Summer Camp for K-6 Students at UVU

Eric Davis, Russell Garner, Ryley Shingleton, Brittany Williams, and Jason Sheetz (Kim Nielsen), U*tah Valley University*
Combining Undergraduate Student Curriculum, Research, and Outreach: High-Altitude Balloons and Rockets

Daniel Jones (Bonnie Baxter), *Westminster College*
Bipyrimidine Signatures as a Photoprotective Genome Strategy in G+C-rich Halophilic Archaea

Bex Kemp & Adam Wolford (Bonnie Baxter), *Westminster College*
Bird Migration and the Biogeography of *Halorubrum* Species

Jason King (Lara Brewer), *University of Utah*
Analysis of Oxygen-Conserving Delivery Methods

Matthew Nelson (Spencer Wendel), *Utah State University*
Utah State University Design, Build, Fly 2016-17

Ann Pham (Lara Brewer), *University of Utah*
Using Heart Rate Waveform Patterns and Frequency to Detect Postoperative Airway Obstruction

Alexander Souvall & Benjamin Russon (J.R. Dennison), *Utah State University*
The Space Survivability Test Chamber

Matthew Toon, Tyler Weening, Zachary Collins, Fred Davis, Christopher Maughan, and Kyle Strong (Kim Nielsen),
Utah Valley University
Undergraduate Examination of Pollutant Aerosols in Earth's Atmosphere

Joshua Webb, Luisa Rusta, Erin Tabish, Edgar Chavez, and Brett Denney (Bonnie Baxter), *Westminster College*
Extracting DNA From Salt: Using PicoGreen to Explore Detection Limits

TEAM POSTERS

Get-Away Special Team (Jan Sojka), *Utah State University*
Ben Taylor, Jacob Yates, Hayden Harmon, Laurel Bingham, Scott Glaittli, Kaeden Ledbetter, Thomas Smith, Ammon Hepworth, Raul Ramirez, Jack Conrad Kiefer II, Kelly Burch, Philip Nelson, Alexandra Hughlett, Emily Clark, Richard Lloyd
HAPCAD, Prototype for the GASPACS Cubesat Aeroboom Deployment

Hybrid Thruster USIP Team (Stephen Whitmore), *Utah State University*
David Brewer, Spencer Mathias, Marc Bulcher, Stephen Merkley, Zac Lewis, Gage Salerno, Mercedes Trujillo, Adam Sorensen, Paul Rau, Steven Bennett, Cameron Turner, Colin Schlicher, Alex Souvall, Jeremy Bradford, Rob Stoddard, Andrew Young, Brianne Knight, Peter Hartvigsen, Patrick Mortola, Russell Babb
Design of In-Flight Instrumentation to Characterize a Hybrid Thruster

Mars South Pole Survey Team (John Armstrong & Michael Hernandez), *Weber State University*
Corey Collatz, Orana Paullus, Casey Graham, Adam Coss, Carmen Longo, Nate Henrie, Alex Lehr, Justin Samuels, Andrew Nelson, Dennis Yu
A Survey of High Albedo Events in Mars South Polar Craters

Passive Inspection CubeSat USIP Team (David Long), *Brigham Young University*
Patrick Walton, Luke Newmeter, Brittany Wilson, Dallon Glick, Ben Biggs, Jeff Nybo, Mark Oman, Connor Olsen, Alexis Fisher, Jacob Willis, Tyler Downs, Nick Kohls, Dan Dahl, Connor Weeks, Evan Jones, Andrew Okazaki, Jacob Holtom, David Strobehn, Keith Garfield, Dan Merrell, Nick Duehring, Michelle Crowder, Kevin Shelby, Joseph Quist, Logan Meyer, Chloe Roedel, Carlos Vilorio, Riley Creer, Stephen Hills, Zach Brock, Cory Robinson, Blake Goodfellow, Nick Walton, Tyler Peterson, Mark Moomey
BYU Passive Inspection CubeSats (PICS)

U**tah Mining Robotics Team** (Jonathan Davies), *University of Utah*
Kaitlin Hall, John Robe, Cole Mortensen, Zachary Oliphant, Rachel Phelps, David Purcell, Justin Schramm, Max Stocking, Matthew Wilson, Fernando de Oliveira Lima Xavier, Samuel Zachary
The Utah Robotic Mining Project: The Design and Implementation of Fully Autonomous Robotic Mining System for Mars