Presentations by Space Grant Students from:

Arizona State University
Embry-Riddle Aeronautical University
Northern Arizona University
University of Arizona
Arizona Western College
Casa Grande Union High School
Central Arizona College
Glendale Community College
Phoenix College
Pima Community College

April 20th, 2024
Tucson, AZ
Welcome to the 33rd annual Arizona NASA Space Grant Statewide Student Research Symposium!

The Symposium consists of a student poster session, four parallel topical sessions, a morning break for coffee, afternoon lunch, and refreshments at the end of the day. We encourage you to use these breaks to network with one another, talk to peers and colleagues from other schools, and take time to make connections.

The Symposium will feature talks from 178 students, with 2 students represented “In Title Only”. In-person talks will typically last ten minutes each, roughly divided as ~8 minutes for presentations and ~2 minutes for questions from the audience.

This symposium is made possible through a NASA grant awarded to the Arizona Space Grant Consortium. The efforts of managers, mentors, steering committee members and Space Grant representatives at Arizona State University, Embry-Riddle Aeronautical University, Northern Arizona University, the University of Arizona, Arizona Western College, Casa Grande Union High School, Central Arizona College, Glendale Community College, Phoenix College, and Pima Community College are acknowledged. Students with a variety of academic backgrounds have come together with their mentors to make the program a success, and this Symposium is a tribute to their dedication and spirit of inquiry.

The Arizona NASA Space Grant Student Research Symposium also recognizes the efforts of many university faculty, private sector, and federal researchers/mentors, who give selflessly of their time and energy to provide leading-edge research experiences to enrich the education of Arizona’s Space Grant students. We thank them all for their past, present and future support.

Timothy Swindle, Director  
Arizona Space Grant Consortium, UArizona

Desiree Crawl, Sr. Coordinator  
ASU NASA Space Grant

Michelle Coe, Program Manager  
Arizona Space Grant Consortium, UArizona

Anne Boettcher, Associate Director  
ERAU NASA Space Grant

Chandra Holifield Collins, Associate Director  
UArizona NASA Space Grant

Elliott Bryner, Associate Director  
ERAU NASA Space Grant

Yancy Shirley, Assistant Director  
UArizona NASA Space Grant

Christopher Edwards, Associate Director  
NAU NASA Space Grant

Thomas Sharp, Associate Director  
ASU NASA Space Grant

Paloma Rose Davidson, Assistant Program Manager  
NAU NASA Space Grant
### Saturday, April 20, 2024, Hilton Tucson East

**8:30-8:50 AM: WELCOME & INTRODUCTION**  
**ROSEWOOD BALLROOM**

**8:50-9:30 AM: ASCEND POSTER SESSION**  
**ROSEWOOD BALLROOM**

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<th>Room</th>
<th>Ocotillo B</th>
<th>Prickly Pear</th>
<th>Mesquite B</th>
<th>Cactus Flower</th>
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</table>
| **TIME (MST)** | **Session A**  
ASTRONOMY & SPACE PHYSICS  
**Moderators:**  
Yancy Shirley, UA  
Tim Swindle, UA  
(9:40 AM – 3:50 PM) | **Session B**  
EARTH & ENVIRONMENTAL SCIENCE/ENGINEERING  
**Moderators:**  
Christopher Edwards, NAU  
Chandra Holifield Collins, USDA-ARS  
(9:40 AM – 2:40 PM) | **Session C**  
AERONAUTICS  
**Moderators:**  
Elliott Bryner, ERAU  
Thomas Sharp, ASU  
(2:40 PM – 3:30 PM) | **Session D**  
PLANETARY SCIENCE  
**Moderators:**  
Sarah Sutton, UA  
Thomas Sharp, ASU  
(9:40 AM – 12:00 PM) |
|               | **Session B**  
EARTH & ENVIRONMENTAL SCIENCE/ENGINEERING  
**Moderators:**  
Christopher Edwards, NAU  
Chandra Holifield Collins, USDA-ARS  
(9:40 AM – 2:40 PM) | **Session F**  
EDUCATION & PUBLIC OUTREACH  
**Moderators:**  
Anne Boettcher, ERAU  
Paloma Rose Davidson, NAU  
(9:40 AM – 11:50 AM) | **Session G**  
AEROSPACE TECHNOLOGY: SPACEFLIGHT & ENGINEERING PROGRAMS  
**Moderators:**  
Anne Boettcher, ERAU  
Elliott Bryner, ERAU  
Ron Madler, ERAU  
(11:50 AM – 3:10 PM) |
|               | **Session C**  
AERONAUTICS  
**Moderators:**  
Elliott Bryner, ERAU  
Thomas Sharp, ASU  
(2:40 PM – 3:30 PM) | **Session E**  
EXPLORATION SYSTEMS ENGINEERING: BIOLOGICAL, MATERIALS, OPTICAL, AND ELECTRICAL  
**Moderators:**  
Jonathan Adams, ERAU  
Michele Zanolin, ERAU  
(12:00 PM – 3:40 PM) | **Session G**  
AEROSPACE TECHNOLOGY: SPACEFLIGHT & ENGINEERING PROGRAMS  
**Moderators:**  
Anne Boettcher, ERAU  
Elliott Bryner, ERAU  
Ron Madler, ERAU  
(11:50 AM – 3:10 PM) |
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<td>Star Formation History of NGC 3344</td>
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<td>Dark Matter Models and Their Impact on Stellar Stream Morphology</td>
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<td>Distributional Methods for Detecting Supernova Gravitational Waves</td>
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<td>Mass Transfer Analysis of Ultracompact X-ray Binary Systems</td>
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<td>Examining the Stellar Population of NGC 3344</td>
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<td>Analyzing Standing Accretion Shock Instability using Gravitational Wavescanva</td>
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<td>10:50-11:10</td>
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<td>MORNING BREAK &amp; REFRESHMENTS IN FOYER</td>
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<td>Time</td>
<td>A-8</td>
<td>B-8</td>
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<td>11:10-11:20</td>
<td>Noah McLeod</td>
<td>Victoria Lang</td>
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<td>Olivia Vester</td>
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<td>Galaxy Morphology of PEARLSDG</td>
<td>Ice Cloud Parameterizations for the Global Climate Models</td>
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<td>Building Computational Models to Understand The Interplay Between Climatic Factors, Air, Transportation, and Infectious Disease Dynamic</td>
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<td>Analyzing the Variability and Orbit of Massive Binary Eta Carinae</td>
<td>Cell Size and Temperature</td>
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<td>Photosynthetic Potential on TRAPPIST-1c: Modeling for Exoplanetary Life</td>
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<td>An Investigation of the Motion of Young Stellar Objects in NGC 1977, with a Focus on Externally Photoevaporating Planet Forming Disks</td>
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<td>Space Weathering of Dark Regolith and Carbonaceous Asteroids</td>
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<td>Dust Continuum Analysis of Distant Galaxies through Simulations of ALMA Observations</td>
<td>Leveraging GIS Technology for Wildfire Response Analysis in Maui</td>
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<td>Optimization of Lunar Map Distortion</td>
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<td>Unveiling the Secrets of Neutron Stars; X-ray Astronomy with Spectro-timing Analysis</td>
<td>Inducing Pressure on Space Perovskite Solar Cells</td>
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<td>Investigating the Cause of Mars' Large Volcanoes from Deep Mantle Convection</td>
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<td>Fitting Density Profiles of Dynamical Dark Matter Halos</td>
<td>Sedimentary Analysis of Eklutna Lake, Alaska, to Understand Glacier Fluctuations Over the Past 9,600 Years</td>
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<td>Investigation of Stress Concentrations in Fused Deposition Modeled Parts</td>
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<td>Analyzing Dust in Distant Galaxies</td>
<td>Protein Domains with Unbalanced Amino Acid Usage are Differentially Lost</td>
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<td>NASA Surveyor Program: Surveyors 1, 3, 5, 6, and 7</td>
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<td>A Formaldehyde Deuteration Survey of Dense Starless Cores in Taurus</td>
<td>Analysis of Extraterrestrial Radiation's Impact on Ozone and its Implications for Climate and Health on a High-Altitude Ballooning Payload</td>
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<td>Transparent Conductive Oxides for Quantum Optical Devices: A Computational Approach</td>
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<td>12:30-1:50</td>
<td>LUNCH IN ROSEWOOD BALLROOM</td>
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<td>1:50-2:00</td>
<td>Transition from Lunch to Breakout Rooms</td>
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| 2:00-2:10 | [A-16] David Polk
Calibrating the ATLAS Calorimeter using Single Particle Interactions with Machine Learning |
|           | [B-16] Jessica Condon
Remote Sensing for Yellowstone Geothermal Area Characterization          |
Comparison of In-process Distortion for Metal Additive Manufacturing Processes Using Simulations |
|           | [G-5] Nikhil Dave, Tyler Thurman
Embedded Software Development on the EagleSat 2 Memory Degradation Experiment |
| 2:10-2:20 | [A-17] Ahmad Qureshi
Digital Analysis of Ionospheric Plasma On-board Waves, Instabilities & Noise Spectrometer (WINS) |
|           | [B-17] Kayshavi Bakshi
Manufacturable & Robust Perovskite Solar Devices for Space               |
|           | [E-5] Mitchell Todd
Optimization of Inverse Kinematics with Deep Learning                     |
|           | [G-6] James Felder
Satellite Research                                                          |
Analyzing Archival FIMS/SPEAR Data to Construct a Far-Ultraviolet Background Map |
|           | [B-18] Ethan Johnson
Dielectrophoretic Characterization of Micron-Sized Mineral Particles      |
|           | [E-6] Michael Villasana
Smart Sandbag for Autonomous Lunar Construction[E-7] Samantha Beauchaine Iron Meteorite Imaging and Database |
|           | [G-7] Gabriel Negrao
3-D Printed Afterglow Filters for Air Pollution Control                   |
| 2:30-2:40 | [A-19] Hannah Gruber
A Comparative Deuteration Survey of Starless Cores                        |
|           | [B-19] Simon Frommuerler
A Tale of Two Trace Metals: A Yellowstone Mystery                         |
|           | [E-7] Samantha Beauchaine
Iron Meteorite Imaging and Database                                        |
|           | [G-8] Rachel Rhomberg
Pneumatic System Integration in Supersonic Flow                            |
| 2:40-2:50 | [A-20] Dare Bartelt
Measuring the Atmosphere of the Hot Jupiter WASP-43b with Gemini-S/IGRINS |
|           | [C-1] Ryan Oppen
Design of Actuated Systems for Flying Machines                            |
|           | [E-8] Leonel Almanzar
Implantable Bone Sensors to Monitor Fracture Healing                      |
Trajectory Optimization for Shuttle Via Earth-Mars Cycler Orbit           |
| 2:50-3:00 | [A-21] Rafael Ortiz
PEARLS: Discovery of Intermediate Redshift Seyfert-like Galaxies with Unique PSF-Features in their Cores Throughout the North Ecliptic Pole Time Domain Field |
|           | [C-2] Kylee Bennett, Davy Stanfield Brown
Characterization of the Effects of Sweep at Low Reynolds Number           |
|           | [E-9] Selena Lamborn
Thin Films For Use in Quantum Networking: Effect of P-type Doping on Spin Coated ITO Thin Films |
|           | [G-10] Genevieve Cooper
Deployable Optical Receiver Aperture (DORA)                                |
| 3:00-3:10 | [A-22] Jake Summers
Searching for Red Rings from Weak AGN with JWST NIRCam                  |
|           | [C-3] Veer Nayar
Flow Temperature Characterization of a Mach 5 Wind Tunnel                |
|           | [E-10] Breck Meagher, Zachary Traynor
Bathymetric LiDAR: Investigation of Optimal Visible Light for Non-Ideal Aquatic Environments |
Aspera Space Mission Science Targets and Analysis                          |
| 3:10-3:20 | [A-23] Aurora Wilde  
A Survey of Singly-Deuterated Ammonia in Prestellar Cores in the Taurus Molecular Cloud | [C-4]  
Lina Youssfi  
Aerospace Alloy Advancements | [E-11] Sarina Blanchard  
Waves, Instabilities, & Noise Spectrometer (WINS) for Earth’s Ionosphere |
|----------|-----------------------------------------------------|-------------------------------|-----------------------------------|
Be Stars: Lambda Pavonis | [C-5]  
Anyell Mata  
Autonomous High-Altitude Balloon Payload | [E-12] Grace Morris  
Development of Machine Learning Assisted Surrogate Models for Complex Space Structures |
Photometric and Astrometric Properties of Ultracool Subdwarfs | | [E-13] Saket Shanbhag  
FPGA-based RADAR Signal Processing |
| 3:40-3:50 | [A-26] Nicolas Mazziotti  
Utilizing Citizen Science to Identify Diffuse Galaxies | | |

**3:50 -**  
AFTERNOON REFRESHMENTS, EVALUATIONS & NETWORKING IN FOYER