Arizona NASA Space Grant Consortium

33rd Annual Statewide Student Research Symposium

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

2023-2024 Arizona NASA Space Grant Consortium
Statewide Student Research Symposium
April 20, 2024

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 3 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

Michelle Coe, Program Manager
Arizona Space Grant Consortium, UArizona

Chandra Holifield Collins, Associate Director
UArizona NASA Space Grant

Yancy Shirley, Assistant Director
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Desiree Crawl, Sr. Coordinator
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Anne Boettcher, Associate Director
ERAU NASA Space Grant

Elliott Bryner, Associate Director
ERAU NASA Space Grant

Christopher Edwards, Associate Director
NAU 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

Room	Ocotillo B	Prickly Pear	Mesquite B	Cactus Flower
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 – 3:20 PM)	**Session D** **PLANETARY SCIENCE** **Moderators:** Sarah Sutton, UA Thomas Sharp, ASU (9:40 AM – 12:00 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 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)

Room	Ocotillo B	Prickly Pear	Mesquite B	Cactus Flower
9:40-9:50	[A-1] *Brandon Pillon, Charles Wszalek* Noise Reduction in Low Frequency LIGO Detectors	[B-1] *Embrey Saville* The Relationship Between Biological Soil Crust, Extracellular Polymeric Substances, and Soil Erosion on Varying Substrates to Investigate Biosignatures on Mars	[D-1] *Greta Freeman* Mapping Mounds in Utopia Planitia to Investigate the Origins of Martian Volcanic Features	[F-1] *Calvin Henggeler, Logan Ruddick* Project Management Practices for Undergraduate Space Projects
9:50-10:00	[A-2] *Naomi Carl* Star Formation History of NGC 3344	[B-2] *Liam Falk* Airborne and Aquatic Micro-Nano Plastic Detection by Machine-Learning-Assisted Multispectral Imaging and Micro-Channel Flow Assays	[D-2] *Travis Matlock* Mapping Martian Crustal Magnetic Anomalies	[F-1] *Calvin Henggeler, Logan Ruddick* Project Management Practices for Undergraduate Space Projects
10:00-10:10	[A-3] *Jack Kohm* Dark Matter Models and Their Impact on Stellar Stream Morphology	[B-3] *Elyssa Baker* Groundwater Monitoring Assessment at the Falls City, Texas Uranium Tailings Disposal Site	[D-3] *Lucienne Morton* Post-Mid-Size Asteroid Impact Long-term Flooding Hazards	[F-2] *Matthew Marquez* Exploration of ChatGPT as a Research Tool for Exoplanet Detection and Analysis
10:10-10:20	[A-4] *Kya Schluterman* Distributional Methods for Detecting Supernova Gravitational Waves	[B-4] *Abigail Haan* Intermittent and Continuous Operation of an Off-Grid Solar Nanofiltration System	[D-4] *Rachel Fry* Analysis of Dust Produced by Experimental Aeolian Transport of Mars-Analog Sands	[F-3] *Madison Marie Easton* The Science of Storytelling: Science Journalism at the Arizona Daily Sun
10:20-10:30	[A-5] *Xander McLendon, Clyde Miller* Mass Transfer Analysis of Ultracompact X-ray Binary Systems	[B-5] *Cameron Fuse* Wildfires Working to Release and Remobilize Contaminants in Rural Arizona	[D-5] *Conor Earley* Atmospheric Revelations: Probing Exoplanets Composition and Structure Through Innovative Instrumentation	[F-4] *Penny Duran* Scientific Writing at UArizona's University Communications
10:30-10:40	[A-6] *Eyan Weissbluth* Examining the Stellar Population of NGC 3344	[B-6] *Alexis-Marie Parrish* Vegetation Monitoring at LM Sites	[D-6] *Dora Elalaoui-Pinedo* Mapping Enigmatic Pits in the North Polar Layered Deposits of Mars	[F-5] *Lindsey Tober* Space For Humans
10:40-10:50	[A-7] *Miriam Biehle* Analyzing Standing Accretion Shock Instability using Gravitational Wavescanva	[B-7] *Gabriella Garza* Tamarisk and Mycorrhizal Fungal Associations in Salix exigua	[D-7] *CGUHS ASCEND* Exploring the Martian Agriculture Frontier: Assessing Tomato Adaptability Through High Altitude Experimentation	[F-6] *Katrina Robertson* Bridges to Belonging
10:50-11:10	**MORNING BREAK & REFRESHMENTS IN FOYER**			

11:10-11:20	[A-8] *Noah McLeod* Galaxy Morphology of PEARLSDG	[B-8] *Victoria Lang* Ice Cloud Parameterizations for the Global Climate Models	[D-8] *Olivia Vester* Building Computational Models to Understand The Interplay Between Climatic Factors, Air, Transportation, and Infectious Disease Dynamic	[F-7] *Virginia Crook* Digitizing Eugene Shoemaker's Legacy
11:20-11:30	[A-9] *Taylor Brown, Shannon Moore* Analyzing the Variability and Orbit of Massive Binary Eta Carinae	[B-9] *Hayden Ferrell* Cell Size and Temperature	[D-9] *Cameron Hrabak* Photosynthetic Potential on TRAPPIST-1e: Modeling for Exoplanetary Life	[F-8] *Sam Campbell* Making Meteorites Accessible
11:30-11:40	[A-10] *Taylor Kalish* An Investigation of the Motion of Young Stellar Objects in NGC 1977, with a Focus on Externally Photoevporating Planet Forming Disks	[B-10] *John Esparza* Earthworks and Ecosystems: A Web-Based Tool for Vegetation Monitoring in the Altar Valley	[D-10] *Emily Clark* Space Weathering of Dark Regolith and Carbonaceous Asteroids	[F-9] *Alexandra Kupersmith* Mars in 3D: Creating Accessible Planetary Science Education
11:40-11:50	[A-11] *Sebastian Montano* Dust Continuum Analysis of Distant Galaxies through Simulations of ALMA Observations	[B-11] *Erin Burgard* Inducing Pressure on Space Perovskite Solar Cells	[D-11] *Jessica Maldonado* Optimization of Lunar Map Distortion	[F-10] *Kayla Blair* Developing NAU's First Undergraduate Science Communication Course
11:50-12:00	[A-12] *Derrick Drango* Unveiling the Secrets of Neutron Stars; X-ray Astronomy with Spectro-timing Analysis	[B-12] *Tatum Hardt* Sedimentary Analysis of Eklutna Lake, Alaska, to Understand Glacier Fluctuations Over the Past 9,600 Years	[D-12] *Ritisha Das* Investigating the Cause of Mars' Large Volcanoes from Deep Mantle Convection	[G-1] *Chance Lawrence* Continuously Integrated Raster Scan Algorithm for Microwave Antenna Holography
12:00-12:10	[A-13] *Tristen Shields* Fitting Density Profiles of Dynamical Dark Matter Halos	[B-13] *Garret Wilson* Protein Domains with Unbalanced Amino Acid Usage are Differentially Lost	[E-1] *Nathan Bleakley, Winona Roulston* Investigation of Stress Concentrations in Fused Deposition Modeled Parts	[G-2] *Sarah Li* CatSat: Ground Station Assembly & Mission Operations
12:10-12:20	[A-14] *Sarah Saavedra* Analyzing Dust in Distant Galaxies	[B-14] *Jessica Condon* Remote Sensing for Yellowstone Geothermal Area Characterization	[E-2] *Chad Cantin* NASA Surveyor Program: Surveyors 1, 3, 5, 6, and 7	[G-3] *Walter Rahmer* CatSat: Preparing for CubeSat Flight Operations and Science
12:20-12:30	[A-15] *Hanga Andras-Letanovszky* A Formaldehyde Deuteration Survey of Dense Starless Cores in Taurus	[B-15] *ASU ASCEND* Analysis of Extraterrestrial Radiation's Impact on Ozone and its Implications for Climate and Health on a High-Altitude Ballooning Payload	[E-3] *Henry Garland* Transparent Conductive Oxides for Quantum Optical Devices: A Computational Approach	[G-4] *Sam Bevier* Exploratory Study on Wind Tunnel Noise Profiles

12:30-1:50	**LUNCH IN ROSEWOOD BALLROOM**			
1:50-2:00	**Transition from Lunch to Breakout Rooms**			
2:00-2:10	[A-16] *David Polk* Calibrating the ATLAS Calorimeter using Single Particle Interactions with Machine Learning	[B-16] *Kayshavi Bakshi* Manufacturable & Robust Perovskite Solar Devices for Space	[E-4] *Juan Machado Jr.* 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] *Ethan Johnson* Dielectrophoretic Characterization of Micron-Sized Mineral Particles	[E-5] *Mitchell Todd* Optimization of Inverse Kinematics with Deep Learning	[G-6] *James Felder* Satellite Research
2:20-2:30	[A-18] *Colton Quirk* Analyzing Archival FIMS/SPEAR Data to Construct a Far-Ultraviolet Background Map	[B-18] *Simon Fronmueller* A Tale of Two Trace Metals: A Yellowstone Mystery	[E-6] *Michael Villasana* Smart Sandbag for Autonomous Lunar Construction	[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	[C-1] *Ryan Oppen* Design of Actuated Systems for Flying Machines	[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-2] *Kylee Bennett, Davy Stanfield Brown* Characterization of the Effects of Sweep at Low Reynolds Number	[E-8] *Leonel Almanzar* Implantable Bone Sensors to Monitor Fracture Healing	[G-9] *Kyle Newlin* 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-3] *Veer Nayyar* Flow Temperature Characterization of a Mach 5 Wind Tunnel	[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-4] *Lina Youssfi* Aerospace Alloy Advancements	[E-10] *Breck Meagher, Zachary Traynor* Bathymetric LiDAR: Investigation of Optimal Visible Light for Non-Ideal Aquatic Environments	[G-11] *Alondra Cardona* 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-5] *Anyell Mata* Autonomous High-Altitude Balloon Payload	[E-11] *Sarina Blanchard* Waves, Instabilities, & Noise Spectrometer (WINS) for Earth's Ionosphere	
3:20-3:30	[A-24] *Sola Nova* Be Stars: Lambda Pavonis		[E-12] *Grace Morris* Development of Machine Learning Assisted Surrogate Models for Complex Space Structures	
3:30-3:40	[A-25] *Hunter Brooks* 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**			