The 3rd



PROGRAM

The SpaceU Symposium brings together space professionals, researchers, and students from across Florida. The Symposium showcases the latest innovations and research driving the future of space science, exploration, and commercialization and builds collaborations across the state's space sector.

Tuesday, October 27, 2026

8:00 AM–5:00 PM

Morning · Fairwinds Alumni Center · Afternoon · SPRK Building

University of Central Florida

Part of UCF Space Week — October 25–30, 2026

THANK YOU TO OUR SPONSORS

3RD SPACEU SYMPOSIUM

Florida Space Institute

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STELLAR

Voyager Technologies

Lockheed Martin

Kennedy Space Center

COSMIC

L3Harris Technologies

Florida Space Institute

Florida Semiconductor Engine

Blue Origin

BAE Systems

Venue Map and Information

The morning program is held at the Fairwinds Alumni Center, and the afternoon program moves to the SPRK Building, both on the University of Central Florida campus. View an interactive map of both locations.



📍 **Fairwinds Alumni Center** 📍 **SPRK Building**

PARKING INSTRUCTIONS

Non-UCF attendees may park in Garage D, where we have 175 reserved spaces. We encourage carpooling.

UCF attendees should use their normal campus parking options elsewhere in Garage D or on campus. As we have 450 people registered, UCF attendees would quickly fill the reserved spaces if they used them, so please don't.

IMPORTANT INFORMATION

📶 **Wifi info:** Connect to UCF_Guest, a browser window will open for establishing the connection, read the message, accept, connect.

♿ **Event Accessibility Notice:** If you are an individual with a disability and need accommodations, please contact SpaceUevents@ucf.edu

🚨 **Emergency Procedures**

- Emergency Line: Dial 911 immediately for critical active threats, fires, or medical crises.
- UCF Police Non-Emergency Line: (407) 823-5555.
- Evacuation Action: Leave via designated stairwells when alarms trigger. Assemble 200 feet from structure.
- Shelter Action: Follow the federal Avoid, Deny, Defend framework. Barricade, darken, and silence phones during active safety lockdowns. Retreat to core rooms for weather.

Full Day Agenda

8:00 AM	**Organizers Meet Up, Volunteers Welcome**	
8:00 AM		**Exhibitor And Poster Setup**
8:30 AM		**Registration Opens And Coffee**
9:00 AM	**Opening**	Dr. Joe Harrington, Dr. Greg Autry, Dr. Luisa F. Zambrano Marin — UCF Space Council
	Welcome Remarks	Dr. Winston V. Schoenfeld, UCF Vice President for Research and Innovation
9:15 AM	**Keynote**	Clayton Turner — Operating Partner, Andromeda Ventures; Former Associate Administrator, NASA Space Technology Mission Directorate; Former Center Director, NASA Langley Research Center
9:40 AM	**Space MBA Scholarship Announcement**	John Vargas, Voyager Technologies; Dean Paul Jarley, Barry S. Miller College of Business (UCF)
9:50 AM	**Spotlight Speaker**	Dr. Alain Berinstain, Florida Space Research Consortium
10:00 AM		**Coffee Break**
10:30 AM	**Panel: Space Force**	Michael Ludes Martindale, SFA (Moderator); Dr. Mehmed Ali, Space Delta XIII; Tyrone Parker, STARCOM; Col. (S) Jason Cano, 320 RSC
11:00 AM	**Spotlight Talks**	Dr. Phil Metzger, Hawking Center (UCF); Ronald Lau, Space Florida; Dr. Jaydeep Mukherjee, NASA-FSGC
11:30 AM	**Space Ideation Challenge Winners' Talks**	Dean Paul Jarley, Assoc. Provost Greg Autry, Prof. Zaheer Ali — Barry S. Miller College of Business
12:00 PM		**Lunch, Networking, Open Posters And Exhibitors**
1:00 PM	**Transition To SPRK Building, Posters And Exhibitors, Networking**	
1:15 PM	**Concurrent Sessions I**	
	Space Vehicle Engineering - Plume Effects	**Room 305**
	Space Vehicle Engineering	**Room 229**
	Physical Sciences	**Room 326**
	Management	**Room 122**
	Life	**Room 324**
	All Other Space Engineering	**Room 101 A-C**
2:15 PM		**Poster Session, Exhibitors, Networking & Sweets**
3:00 PM	**Concurrent Sessions II**	
	Space Vehicle Engineering - Plume Effects	**Room 305**
	Space Vehicle Engineering	**Room 229**
	Physical Sciences	**Room 326**
	Management	**Room 122**
	Life	**Room 324**
	All Other Space Engineering	**Room 101 A-C**
4:00 PM		**Networking, Posters, Farewell!**
4:30 PM	**Takedown**	

Morning Speakers



OPENING

Dr. Joe Harrington

UCF Space Council
Department of Physics · Florida Space Institute



OPENING / SPACE IDEATION CHALLENGE

Dr. Greg Autry

UCF Space Council
Associate Provost, College of Business



OPENING

Dr. Luisa F. Zambrano Marin

UCF Space Council
Florida Space Institute (UCF)



WELCOME REMARKS

Dr. Winston V. Schoenfeld

UCF Vice President for Research and Innovation



KEYNOTE

Clayton Turner

Operating Partner,
Andromeda Ventures



SPACE MBA SCHOLARSHIP ANNOUNCEMENT

John Vargas

Executive Vice President and Head of Growth,
Voyager Technologies



SPACE MBA SCHOLARSHIP ANNOUNCEMENT

Colleen McLeod

Director of Growth/Academic Engagement,
Voyager Technologies



SPOTLIGHT SPEAKER

Dr. Alain Berinstain

Director, Florida Space Research Consortium
Director, Florida Space Institute (UCF)
UCF Space Council



PANEL: SPACE FORCE (MODERATOR)

Michael Ludes Martindale

Director of Education,
Space Force Association



PANEL: SPACE FORCE

Dr. Mehmed Ali

Provost and Chief Learning Officer,
Space Delta XIII, United States Space Force



PANEL: SPACE FORCE

Tyrone Parker

Lead for Civilian Recruiting,
STARCOM, U.S. Space Force



PANEL: SPACE FORCE

Col. (S) Jason Cano

Commander,
320th Recruiting Squadron, U.S. Space Force



SPOTLIGHT TALKS

Dr. Phil Metzger

Director,
Hawking Center for Microgravity Research
Florida Space Institute
UCF Space Council



SPOTLIGHT TALKS

Ronald Lau

Chief Investment Officer,
Space Florida



SPOTLIGHT TALKS

Dr. Jaydeep Mukherjee

Director,
NASA Florida Space Grant Consortium
Florida Space Institute (UCF)



SPACE IDEATION CHALLENGE

Dr. Erika Wagner

Space Ideation Challenge Judge,
The Exploration Company



SPACE IDEATION CHALLENGE

Dean Paul Jarley

Barry S. Miller College of Business (UCF)



SPACE IDEATION CHALLENGE

Prof. Zaheer Ali

Director, Space MBA,
Barry S. Miller College of Business (UCF)
UCF Space Council

Concurrent Sessions

Space Vehicle Engineering - Plume Effects

Room 305

Session Chair: Prof. Phil Metzger

SESSION I **1:15–2:15 PM**

1:15 PM	Dr. Jared Long-Fox	UCF	Characterizing Plume-Surface Interaction Effects on Planetary Surfaces with SPARTA
1:30 PM	Javier Ramos Salamo	UCF	Decay Constant Extraction From Images Of Laser Propagation In Dust Plumes
1:45 PM	Maribel Garcia	UCF	Exploration of Nozzle Design's Influence on Plume Surface Interactions (PSI) Physics
2:00 PM	Noah Brockhoff	UCF	Approximating Regolith Displacement from Single Nozzle Plume Impingement at Varying Descent Velocities

SESSION II **3:00–4:00 PM**

3:00 PM	Cody Bevilacqua	UCF	Plume Surface Interactions of Transverse Gas Flow Over Charged Lunar Regolith Simulant
3:15 PM	Owen Baylor	UCF	Investigation of Laser Power Loss From Suspended Lunar Regolith
3:30 PM	Andrew Klein	UCF	Geotechnical Properties of Lunar Regolith Simulants and Their Influence on Cohesion
3:45 PM	Christopher Duffey	UCF	Rapid In-Situ Identification of Lunar Surface Resources and Contaminants Using Mid-Infrared OPTIR Spectroscopy

All speakers in this session are also displaying a poster, except Dr. Jared Long-Fox (UCF), which is an invited contribution.
[Poster Session 2:15–3:00 PM]

Space Vehicle Engineering

Room 229

Session Chair: TBA

SESSION I **1:15–2:15 PM**

1:15 PM	Pablo Rivero	FIT	Launching Rockets from Bolivia's High Altitude Altiplano: A Comparison between El Alto and Cape Canaveral
1:27 PM	Aidan Hall	UCF	Design of a Lunar Adjustable Multipurpose Stand for NASA Micro-g NExT
1:39 PM	Edward Clutter	UCF	A Semi-Empirical Reduced-Order Model for Heat Shield Separation
1:51 PM	Isabelle Kaltenbaugh	UCF	Characterization of Freezing-Induced Stiffness Changes in Fluid-Filled Structural Members
2:03 PM	Kevin Johnson	UCF	Toward Sustained Flight at Uranus: A Multidisciplinary Design Framework for a Fixed-Wing Explorer

SESSION II **3:00–4:00 PM**

3:00 PM	Prof. Paula do Vale Pereira	UCF	The Astrodynamics and Space Technology Research & Analysis (ASTRA) Lab at UCF
3:12 PM	Shelby Wooten	UCF	Project Neptune: Design and Development of a Full-Scale Collegiate Sea-Based Launch Vehicle
3:24 PM	Elham Hasani	UCF	Powering the Skies: Hydrogen Fuel Cells and the Future of Passenger Aviation
3:36PM	Martin Fernandez-Stoll	UCF	KLEO-1: UCF's First Student Satellite
3:48 PM	Keanu Brayman	UCF	Rapid Orbit Motion Emulator (ROME)

All speakers in this session are also displaying a poster.
[Poster Session 2:15–3:00 PM]

Physical Sciences

Room 326

Session Chair: Associate Prof. Kerri Donaldson Hanna

SESSION I **1:15–2:15 PM**

1:15 PM	Dr. Aroh Barjatya	ERAU	Space Weather Assessment and Monitoring Instrument
1:25 PM	Pramod Raghav Mulagala	FIT	SiO Maser Isotopologue Research in O-AGB star Classification
1:35 PM	Prof. Ryan Ogliore	UCF	Io Sample Return
1:45 PM	Prof. Peter Delfyett	UCF	PHOENIX: A Photonics-Enabled Heterodyne Submillimeter/Far-Infrared Interferometer for Planet Formation, Star Formation, and Galaxy Evolution
1:55 PM	Hannah Nithilla Ilango Samuel Peter	UCF	Excision of Drifting RFI in Arecibo 12 m Telescope Observations Using Deep Learning
2:05 PM	Genevieve Markees	UCF	Performance simulations of photonic-enabled exoplanet spectroscopic sensor (PEEPSS) for HWO

SESSION II **3:00–4:00 PM**

3:00 PM	Gabriel Struhar	UCF	Exploring Io's Accretion and Evolution with MELTS
3:10 PM	Ema Vo	UCF	SMASHSpec: A Testbed for Actively-Stabilized Extreme Precision Radial Velocity Spectrographs
3:20 PM	Dr. Antoine Bourget	UCF	Shape Model of the Near-Equal Binary Near-Earth Asteroid (190166) 2005 UP156
3:30 PM	Cameron Kelley	UCF	Smoothing parameter optimization for inverting Fredholm integral equations in light scattering
3:40 PM	Angelina Minocha	UCF	Impacts of Experimental Factors on the Simulated Space Weathering of Carbonaceous Chondrite Meteorites
3:50 PM	Robert Conwell	UCF	HelioComb - A Laser Frequency Comb Heterodyne Spectrometer for Kilohertz Resolution Solar Observations

In addition, the following posters for this session are on display throughout the afternoon. Zeina Benton (UCF) · Nagendra Dhakal (UCF) · Liam Gallagher (UCF) · Prof. Joseph Harrington (UCF) · Liza Quinn, M.Sc (UCF) · Sean Marshall (UCF) · Lorraine Roselló Del Valle [Angelina Minocha] (UCF) · Hannah Nithilla (UCF) · Natasha Popenoe (UCF) · Rishant Prakash (UCF) · Daejhanae Smith (UCF) · Ishita Solanki (UCF).
[Poster Session 2:15–3:00 PM]

Management

Room 122

Session Chair: Prof. Zaheer Ali

SESSION I **1:15–2:15 PM**

1:15 PM	Dr. Stephen Pratt	UCF	Wed, Bred, Med & Dead: Weddings, Births, Health and Death in Space Hospitality
1:35 PM	Dr. Sierra Pollard	ERAU	The Future of Space Entrepreneurs (Space Innovation & Workforce Development)
1:55 PM	Dr. Susan Zhong	UCF	Integrating Health Science into Orbital Travel Experience Design: A Wellness-focused Consumer Journey Map

SESSION II **3:00–4:00 PM**

3:00 PM	Jim Plaxco	Chicago Society for Space Studies (CSSS)	PaaS as an Economic Framework for Lunar Development
3:20 PM	Mr. Ted Delgado	Lawrence Livermore National Laboratory	Partnering with Universities and Industry
3:40 PM	Charles Major	UCF	Spaceport Location Suitability, Space Launch Complex & Spaceport Analytics

In addition, the following posters for this session are on display throughout the afternoon. Forest Ma [Dr. Stephen Pratt] (UCF).
[Poster Session 2:15–3:00 PM]

Life

Room 324

Session Chair: Prof. Emmanuel Urquieta

SESSION I **1:15–2:15 PM**

1:15 PM	Prof. Melchor Antunano	UCF	Medical Research Gaps in Support of Human Commercial Spaceflights
1:25 PM	Prof. Tie Liu	UF	From Spectral Signatures to Freshness: Integrating Hyperspectral Imaging, Multi-Omics, and AI for Postharvest Quality
1:35 PM	Prof. Konstantin Vodopyanov	UCF	Ultra-Sensitive Molecular Detection with Frequency Combs: From Human Breath to Planetary Exploration.
1:45 PM	Allen Shorey	UCF	Subgrouping in Teams: Testing an Intervention for Mitigation
1:55 PM	Deep Thakkar	UF	From UF to Zurich: Building the Next Generation of Space Life Scientists through Transatlantic Collaborations for Parabolic Flight Campaigns
2:05 PM	Helen Navach	UCF	Regolith to Rations: Cultivating Oyster Mushrooms in Martian Simulant for Food and Construction

SESSION II **3:00–4:00 PM**

3:00 PM	Jannah Barakat	UCF	Passive Arm-Leg Coupling Exosuit for Neuromechanical Rehabilitation Following Spaceflight
3:10 PM	Dr. Shawn Wright	UCF	Preparing Artemis astronauts for geologic fieldwork, sample collection, and lunar regolith analyses at the only terrestrial analog crater with basaltic ejecta
3:20 PM	Ms. Sachita Saravanan	UCF	Effect of Increasing Nutrient Concentration on Ocimum Basilicum Seeds in Lunar Regolith Simulant
3:30 PM	Professor Shawn Burke	UCF	Culture in Orbit: How Diversity and Time Shape Team Interaction in Spaceflight
3:40 PM	Reese Laushot	UCF	A Kidney Stone in Microgravity — Examining Physical and Chemical Properties of Calcium Crystals Formed in Microgravity
3:50 PM	Pedro Henrique Rodrigues Bezerra	UCF	Effects Of Simulated Microgravity And Caffeine On Actin Filament Mechanics

In addition, the following posters for this session are on display throughout the afternoon. Eveliina Foster (UCF). [Poster Session 2:15–3:00 PM]

All Other Space Engineering

Room 101 A-C

Session I Chair: Prof. Stephen Eikenberry · Session II Chair: Prof. Shin Young Jeong

SESSION I **1:15–2:15 PM**

1:15 PM	Prof. Stephen Eikenberry	UCF	Space Domain Awareness and Remote Sensing Below the Diffraction Limit
1:25 PM	Amelia Brumfield	FIT	Advancing Melt Probes for the Exploration of Ocean Worlds
1:35 PM	Derek Nguyen	UCF	Utilizing Machine Learning to Identify Unknown Satellites
1:45 PM	Dylan Hernquist	ERAU	Advances in Resident Space Object Identification Using Unresolved Optical Space Imagery
1:55 PM	Matthew Crews	UCF	Bridging Micro-Scale Adhesion and Scalable DEM for Irregular, Charged Lunar Regolith
2:05 PM	Meagan Thatcher	UCF	Predicting Orbital Motion Using Physics-Informed Neural Networks (PINNs) for On-Board Autonomous Guidance and Navigation

SESSION II **3:00–4:00 PM**

3:00 PM	James Jackson	UCF	Investigating strontium iridate (SIO) film growth for use in B-site doped strontium titanate (STO) memristor technology.
3:10 PM	Prof. Shin Young Jeong	UCF	Thermal Energy Storage Using Abundant Lunar Regolith for Lunar Habitats
3:20 PM	Samantha Rogers	ERAU	Affordance-Based Grasp Identification for Autonomous Satellite Capture Using Image Segmentation
3:30 PM	Samuil Nikolov	ERAU	A Digital Twin for EagleCam 2: Lunar Imaging and Camera Modeling
3:40 PM	Andrew Dean	UCF	Lunar Scalable Outpost Power Evaluation (L-SCOPE): Effects of Illumination on Base Energy Balance in Polar Regions.
3:50 PM	Micah Boudreau	UCF	Polyhedral Gravitational Modelling Validated with FreeFlyer for Earth-like Bodies

In addition, the following posters for this session are on display throughout the afternoon. Tara Crowe (UCF) · David Smith (UCF) · Intouch Srijumnong (UCF) · Ishaben Trada (UCF).
[Poster Session 2:15–3:00 PM]

Exhibitors

Aerospace Medicine Interest Group

Astronomy Society

BAE Systems, Inc

College of Business

College of Engineering and Computer Science (CECS)

Florida Photonics Cluster

Florida Semiconductor Engine

Florida Space Grant Consortium

Kennedy Space Center

Knights Satellite Club at UCF

L3Harris

NASA Technology Transfer

NSS

Society of Women in Space Exploration (SWISE)

Southeast Analog (SEA)

STARCOM HQ (USSF)

The Hawking Center for Microgravity Research

Voyager Technologies

Abstracts

Space Vehicle Engineering - Plume Effects

Investigation of Laser Power Loss From Suspended Lunar Regolith

Owen Baylor · UCF · **POSTER + TALK**

Lunar regolith poses challenges for future exploration as it impairs lasers used for communications and power delivery. During the 2026 Lunabotics challenge, we measured how power dropped during robotic activity, showing drops of 25% from the baseline when rovers dumped regolith and kicked up dust.

Plume Surface Interactions of Transverse Gas Flow Over Charged Lunar Regolith Simulant

Cody Bevilacqua · UCF · **POSTER + TALK**

We are developing an apparatus for studying plume-surface interactions (PSIs) of gas flowing transversely across lunar regolith simulant with and without plasma-induced grain charging. The results help benchmark computer models used to plan planetary missions and shed insights into PSI physics.

Approximating Regolith Displacement from Single Nozzle Plume Impingement at Varying Descent Velocities

Noah Brockhoff · UCF · **POSTER + TALK**

Plume-surface interactions erode regolith during landings. We impinged compressed air through a 1.5 mm nozzle onto LHS-2E lunar simulant in 30–90 s descent/idle trials. Crater shape shifts from cylindrical to hemispherical as velocity rises; erosion is governed by early, high-velocity flow.

Rapid In-Situ Identification of Lunar Surface Resources and Contaminants Using Mid-Infrared OPTIR Spectroscopy

Christopher Duffey · UCF · **POSTER + TALK**

Sustained Artemis lunar exploration demands rapid in-situ regolith characterization and organic contaminant detection. Because traditional tools are limited by complex sample preparation and resolution constraints, we propose a compact spectroscopic method based on O-PTIR (Mid IR) as an essential tool for site assessment, excavation, and ISRU.

Exploration of Nozzle Design's Influence on Plume Surface Interactions (PSI) Physics

Maribel Garcia · UCF · **POSTER + TALK**

Plume surface interactions occur between exhaust plumes and landing surfaces. While past studies focus on idealized nozzles for missions, this study explores varying atmospheric environments and nozzle expansions to see how simulants are affected.

Geotechnical Properties of Lunar Regolith Simulants and Their Influence on Cohesion

Andrew Klein · UCF · **POSTER + TALK**

To aid in lunar surface exploration, our study experimentally investigates geotechnical properties of lunar regolith simulants. Our results identify key material properties that most strongly influence regolith cohesion, helping to inform the design of critical lunar surface infrastructure.

Space Vehicle Engineering - Plume Effects

Characterizing Plume-Surface Interaction Effects on Planetary Surfaces with SPARTA

Dr. Jared Long-Fox · UCF · **TALK**

This concept proposes using SPARTA to characterize how rocket plume-surface interactions may alter planetary regolith. The approach would assess changes in near-surface mechanical properties to inform landing-site science, surface operations, and future mission design.

Decay Constant Extraction From Images Of Laser Propagation In Dust Plumes

Javier Ramos Salamo · UCF · **POSTER + TALK**

The EjectaBLAST instrument characterizes particle size distributions in lunar-lander ejecta plumes using laser propagation. An image-analysis pipeline corrects camera distortion, tracks laser beams, and extracts wavelength-dependent attenuation coefficients for plume analysis.

Space Vehicle Engineering

Rapid Orbit Motion Emulator (ROME)

Keanu Brayman · UCF · **POSTER + TALK**

The Rapid Orbit Motion Emulator (ROME) is designed to be a hardware-in-the-loop testbed for orbital control algorithms, proximity operations, and space robotics. It consists of a four-wheeled ground vehicle, a six-degree-of-freedom robotic manipulator, and a motion capture system used to emulate the motions of a spacecraft.

A Semi-Empirical Reduced-Order Model for Heat Shield Separation

Edward Clutter · UCF · **POSTER + TALK**

Current methods for studying heat shield separation use large scale tests and computational fluid dynamics. The development of digital twins used to model entire spacecraft through their mission phases requires a reduced order model for heat shield separation. This work will produce such a model.

KLEO-1: UCF's First Student Satellite

Martin Fernandez-Stoll · UCF · **POSTER + TALK**

Knights Satellite Club at UCF prepares students for orbital missions through tethered and high-altitude balloons, ground stations, and hands-on engineering. Its first CubeSat, KLEO-1, uses the PROVES platform to receive telemetry from low Earth orbit, building student expertise and repeatable processes for future missions.

Design of a Lunar Adjustable Multipurpose Stand for NASA Micro-g NExT

Aidan Hall · UCF · **POSTER + TALK**

SEDS-UCF is developing a Lunar Adjustable Multipurpose Stand for NASA's Micro-g NExT Challenge. The design aims to provide a stable and adaptable platform for equipment during lunar surface operations. It can adjust to uneven terrain while remaining portable and usable by astronauts during EVA.

Powering the Skies: Hydrogen Fuel Cells and the Future of Passenger Aviation

Elham Hasani · UCF · **POSTER + TALK**

Hydrogen fuel cells could support lower-emission passenger aviation by supplying electricity to aircraft propulsion systems. This study examines their potential benefits and key challenges, including hydrogen storage, system weight, safety, and integration with batteries.

Toward Sustained Flight at Uranus: A Multidisciplinary Design Framework for a Fixed-Wing Explorer

Kevin Johnson · UCF · **POSTER + TALK**

This research develops a multidisciplinary design framework for a fixed-wing Uranus explorer, linking atmospheric models, aerodynamics, radioisotope power, and energy management to assess the feasibility of sustained flight and in-situ atmospheric science.

Space Vehicle Engineering

Characterization of Freezing-Induced Stiffness Changes in Fluid-Filled Structural Members

Isabelle Kaltenbaugh · UCF · **POSTER +** TALK

Freezing within fluid-filled structural channels may enable adaptive stiffness by turning enclosed fluids into load-bearing solids. Harnessing low-temperature environments could benefit deployable booms and spacecraft structures. Laboratory and high-altitude balloon testing evaluate these effects.

The Astrodynamics and Space Technology Research & Analysis (ASTRA) Lab at UCF

Prof. Paula do Vale Pereira · UCF · **POSTER +** TALK

This talk will give a summary on the research being performed at the Astrodynamics and Space Technology Research & Analysis (ASTRA) Lab, highlighting the projects being led by our graduate students and inviting attendees to stop by their posters.

Launching Rockets from Bolivia's High Altitude Altiplano: A Comparison between El Alto and Cape Canaveral

Pablo Rivero · FIT · **POSTER +** TALK

Due to high elevation, lower latitude and closeness to the equator, El Alto could potentially provide performance advantages for orbital launches. However, these benefits may be overturned due to safety, geographical, and operational limitations from the region.

Project Neptune: Design and Development of a Full-Scale Collegiate Sea-Based Launch Vehicle

Shelby Wooten · UCF · **POSTER +** TALK

Project Neptune is a UCF-led aerospace engineering initiative focused on the development of a collegiate rocket in collaboration with UCF's AIAA and SEDS. Supported by Seagate Space, Neptune targets the first collegiate offshore launch, integrating propulsion, structures, avionics, and recovery systems with a goal of reaching the Kármán line.

Physical Sciences

Space Weather Assessment and Monitoring Instrument

Dr. Aroh Barjatya · ERAU · **POSTER +** TALK

A Planar Ion Probe (PIP) measures high-cadence absolute ion density in planetary ionospheres. We present instrument performance from the NASA LLITED dual CubeSat mission and from sounding rocket dropsondes, enabling simultaneous multi-point measurements. The instrument has low SWaP and is intended to fly on constellations of 100+ satellites.

TOF-ICP-MS Analysis of Basalt Analogs for Io Plume Sampling

Zeina Benton · UCF · **POSTER**

Io, Jupiter's moon with active silicate volcanism, remains underexplored. Sample mission return and analysis using time-of-flight inductively coupled plasma mass spectrometry could measure elemental abundances, constrain Io's composition, and reveal its origin and evolution, a history obscured by constant lava resurfacing.

Shape Model of the Near-Equal Binary Near-Earth Asteroid (190166) 2005 UP156

Dr. Antoine Bourget · UCF · **POSTER +** TALK

(190166) is a near equal mass binary Amor asteroid with an Earth approach (0.13 au) in 2017, where its binary nature was shown by lightcurves analysis. 2017 observations confirmed a period of 40.542 ± 0.008 hr, agreeing with the period from 2014 lightcurves, though no mutual events occurred in 2014.

HelioComb - A Laser Frequency Comb Heterodyne Spectrometer for Kilohertz Resolution Solar Observations

Robert Conwell · UCF · **POSTER +** TALK

HelioComb is a near-infrared (NIR) heterodyne instrument which achieves a signal-to-noise ratio sufficient for Very Long Baseline Interferometry (VLBI). NIR VLBI may enable ground-based diffraction-limited resolution of millimeter-sized objects in low Earth orbit. As proof of concept, we use HelioComb to measure the Solar Gravitational Redshift.

PHOENIX: A Photonics-Enabled Heterodyne Submillimeter/Far-Infrared Interferometer for Planet Formation, Star Formation, and Galaxy Evolution

Prof. Anish Roshi Damodaran [Peter Delfyett] · UCF · TALK

PHOENIX is a photonics-enabled submm/FIR space interferometer concept for studying planet formation, star formation, and galaxy evolution at unprecedented resolution. Optical frequency combs and integrated photonics enable synchronization, metrology, LO distribution, and signal transport across a 25-spacecraft, kilometer-scale array.

Physical Sciences

Laboratory Validation of Multispectral Laser Attenuation for Lunar Ejecta Characterization

Nagendra Dhakal · UCF · **POSTER**

We validate EjectaBLAST, a multispectral laser diagnostic for characterizing lunar ejecta. Experiments using eight wavelengths (404–967 nm) and Mie theory reveal weak spectral dependence of extinction decay constants, consistent with geometric optics. Results support laser attenuation measurements for studying lunar plume–surface interactions.

Arecibo Radio Frequency Interference Mitigation System Development and Testing

Liam Gallagher · UCF · **POSTER**

We present the Arecibo Radio Frequency Interference Mitigation System (ARMS), a reconfigurable FPGA-GPU platform for developing real-time RFI detection and adaptive mitigation algorithms. Integrated with the Arecibo 12 m telescope, ARMS evaluates real-time strategies to improve observations in challenging RFI environments.

Teaching Introductory Astronomy Using Only a Video Game, No Textbook, No Lecture

Prof. Joseph Harrington · UCF · **POSTER**

I taught the general-education astronomy course at UCF using only a video game, no textbook, no lecture. The cost to students was $40 and included a virtual planetarium and numerous games and puzzles to solve. Over 90% of students completed every assignment, un-heard-of in general education courses.

Smoothing parameter optimization for inverting Fredholm integral equations in light scattering

Cameron Kelley · UCF · **TALK**

We present a numerical method for returning particle size distributions from light scattered at several wavelengths. The method identifies local minima in the rate of change of the retrieved solution and rejects poorly constrained solutions using quantitative measures of linearity to find the smoothing parameter in discretized integral equations

Design and Fabrication of Ring and Standard Photonic Lanterns for High-Contrast Exoplanet Imaging with the Habitable Worlds Observatory

Liza Quinn, M.Sc · UCF · **POSTER**

We present the design and fabrication of standard and ring photonic lanterns for space-based exoplanet instrumentation. Using precision fiber packing and adiabatic tapering, we engineer these devices to transform multimode optical fields into single-mode outputs, enabling modal wavefront sensing and spectroscopy for future space telescopes.

Physical Sciences

Performance simulations of photonic-enabled exoplanet spectroscopic sensor (PEEPSS) for HWO

Genevieve Markees · UCF · **POSTER + TALK**

PEEPSS (Photonic-Enabled ExoPlanet Spectroscopic Sensor) is a combined wavefront sensor and science channel which can sit at the science focal plane of the Habitable Worlds Observatory. This poster will present preliminary wavefront sensing simulations for this photonic lantern-based module.

Shape Models of Near-Earth Asteroids from Radar, Lightcurve, and Occultation Data

Sean Marshall · UCF · **POSTER**

We present shape models of three near-Earth asteroids: 3200 Phaethon, 163693 Atira, and 385186 (1994 AW1). All three were observed with Arecibo Observatory's radar, and with lightcurves from numerous locations. Phaethon is the target of JAXA's upcoming DESTINY+ mission. Atira and AW1 are binaries.

Impacts of Experimental Factors on the Simulated Space Weathering of Carbonaceous Chondrite Meteorites

Lorraine Roselló Del Valle [Angelina Minocha] · UCF · **POSTER + TALK**

Simulated space weathering experiments on carbonaceous chondrite meteorites have historically yielded conflicting spectral trends in the visible to near infrared spectral region. We explore how experimental factors, such as physical sample state, have contributed to these conflicts through a series of simulated space weathering experiments.

SiO Maser Isotopologue Research in O-AGB star Classification

Pramod Raghav Mulagala · FIT · **POSTER + TALK**

AGB (late phase of most low-mass stars) are either O-rich or C-rich. SiO MASERs from AGBs stars are indicators of them being O-rich. Among the different J's, v's, and isotopologues that SiO masers occur at, BAaDE noticed that some sources displayed unusual behavior. This work reports their behavior-compatibility in high-J from SMA observations.

Excision of Drifting RFI in Arecibo 12 m Telescope Observations Using Deep Learning

Hannah Nithilla · UCF · **POSTER**

We present a lightweight U-Net for radio frequency interference (RFI) detection and excision in Arecibo 12 m telescope spectrograms. Trained on simulated RFI, AOFlagger-labeled data, and manual annotations, the model's performance is compared with AOFlagger across diverse and challenging RFI environments.

Io Sample Return

Prof. Ryan Ogliore · UCF · **POSTER + TALK**

Sample return from a volcanic plume on Jupiter's moon Io offers a unique opportunity to study planet-building processes in a tidally heated outer Solar System world.

Physical Sciences

Excision of Drifting RFI in Arecibo 12 m Telescope Observations Using Deep Learning

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Addressing Adaptive Optics Time-lag with The FastrSHWFS

Natasha Popenoe · UCF · **POSTER**

Adaptive optics (AO) is a required approach to enable imaging of exoplanets and speed of an AO system limits our ability to detect them. Detector read time is often a large component of AO lag. To address this, we present two designs and test results for a modified Shack-Hartmann wavefront sensor.

The Solar System's First Solids: What Calcium–Aluminum-Rich Inclusions Reveal About Its Earliest History

Rishant Prakash · UCF · **POSTER**

Calcium–aluminum-rich inclusions (CAIs) are among the Solar System's oldest solids and preserve records of its initial conditions. Variations across multiple isotopic systems constrain nucleosynthetic heterogeneity, reservoir structure, radial transport, and disk evolution. This poster examines CAIs as tracers of early isotopic heterogeneity.

Searching for Residual Cometary Activity in a Candidate Dormant Comet Population

Daejhanae Smith · UCF · **POSTER**

The discovery of comet-like activity in some asteroids and the absence of observable activity in some presumed comets suggests the existence of an asteroid-comet continuum. In this work, we search for remnant activity in archival imaging of dormant comet candidates and derive gas production rate upper limits for comparison with active comets.

The Lucy Mission: Planning Encounter Science Observations

Ishita Solanki · UCF · **POSTER**

The NASA Lucy mission will be the first to study asteroids in the Trojan swarm. The science observation sequences for the L4 targets Eurybates, Polymele, Leucus, and Orus are in mature stages of development. The observations planned map to the science goals of mass determination, composition, geology, interior properties, and satellite search.

Physical Sciences

Exploring Io's Accretion and Evolution with MELTS

Gabriel Struhar · UCF · **POSTER +** TALK

Jupiter formed 0.5–1 Myr after CAIs, before chondrites (2–4 Myr), so known meteorites are unlikely Io precursors. Io's starting materials and differentiation paths are heavily debated. We built automated MELTS models from prior research to better understand Io's accretion and evolution.

SMASHSpec: A Testbed for Actively-Stabilized Extreme Precision Radial Velocity Spectrographs

Ema Vo · UCF · **POSTER +** TALK

SMASHSpec is an actively stabilized, cross-dispersed echelle spectrograph for next-generation EPRV. Using single-mode fiber input, laser-comb calibration, path-length metrology, thermal control, and a cryogenic vacuum, it targets R>100,000 over 380–930 nm with long-term stability of a few cm/s/year.

Management

Partnering with Universities and Industry

Mr. Ted Delgado · Lawrence Livermore National Laboratory · TALK

Lawrence Livermore's university and industry partnerships connect frontier research, talent, national-security missions, and commercial innovation. Examples span student programs, responsive space, and the transition of laboratory technologies into scalable products.

Spaceport Location Suitability, Space Launch Complex & Spaceport Analytics

Charles Major · UCF · TALK

Integrated spaceport analytics methodology combining site suitability screening, launch complex simulation, and GIS analysis. The framework identifies and validates candidate locations, models launch cadence and infrastructure performance, and leverages open-source tools to support scalable, data-driven spaceport planning investment decisions.

PaaS as an Economic Framework for Lunar Development

Jim Plaxco · Chicago Society for Space Studies (CSSS) · TALK

The core challenge to the economic development of the Moon are the environmental, infrastructure, and market obstacles. An economic framework to minimize these hurdles is a prerequisite to initiating sustainable lunar development. A Platform-as-a-Service development model is proposed as a solution.

The Future of Space Entrepreneurs (Space Innovation & Workforce Development)

Dr. Sierra Pollard · ERAU · **POSTER +** TALK

The future of space depends on more than technology it depends on people prepared to build what comes next. This talk explores workforce development, entrepreneurship, and experiential education as tools to prepare the next generation of founders, innovators, and leaders for the growing space economy.

Wed, Bred, Med & Dead: Weddings, Births, Health and Death in Space Hospitality

Forest Ma [Dr. Stephen Pratt] · UCF · **POSTER +** TALK

Through interviews and site visits with 18 experts, we explored how hospitality applies to life events in space. Key themes included physiological unknowns, food as a psychological and social anchor, inadequate space law, and hospitality's limited design role. Findings suggest hospitality offers the human-centered expertise spaceflight lacks.

Integrating Health Science into Orbital Travel Experience Design: A Wellness-focused Consumer Journey Map

Dr. Susan Zhong · UCF · **POSTER +** TALK

This project develops a wellness-focused consumer journey map for orbital space travel by integrating health science and experience design. Through interviews with 15-20 space health and space experts, it identifies key touchpoints, wellness risks, and interventions across pre-flight, in-flight, and post-flight to enhance space travel experience.

Life

Medical Research Gaps in Support of Human Commercial Spaceflights

Prof. Melchor Antunano · UCF · **TALK**

Medical and human factors research gaps remain a significant barrier to the safe and sustainable growth of commercial human spaceflight. Priority areas include medical standards, health monitoring, operational performance, human-system integration, and safety. A coordinated civilian spaceflight research program is needed to generate the evidence base for future regulations, risk mitigation, and operational best practices.

Passive Arm-Leg Coupling Exosuit for Neuromechanical Rehabilitation Following Spaceflight

Jannah Barakat · UCF · **POSTER + TALK**

Long-duration spaceflight can impair lower-limb strength and coordination. We evaluated a passive arm-leg coupling exosuit in 15 adults. The system reduced lower-limb muscle activation while preserving natural gait, supporting its potential for post-spaceflight rehabilitation.

Effects Of Simulated Microgravity And Caffeine On Actin Filament Mechanics

Pedro Henrique Rodrigues Bezerra · UCF · **POSTER + TALK**

Studying actin polymerization under simulated microgravity on Earth using a Random Positioning Machine. Preliminary TIRF microscopy data show that microgravity yields 25% longer and 54% more flexible filaments. The effects of microgravity on actin filaments are expected to be halted by caffeine, known for its depolymerizing role.

Culture in Orbit: How Diversity and Time Shape Team Interaction in Spaceflight

Professor Shawn Burke · UCF · **POSTER + TALK**

Spaceflight is an international endeavor, as such most crews are multi-cultural. However, little attention has been paid to this aspect of spaceflight and how it may impact team interaction. In this NASA funded effort we will present work that speaks to the impact of cultural diversity on team interaction and the role of time on this relationship.

Microfluidic Mass Transport Dynamics Under Parabolic Microgravity Conditions

Eveliina Foster · UCF · **POSTER**

Microgravity disrupts fluid transport, altering drug pharmacokinetics unpredictably. We'll fly microfluidic chips on a parabolic flight to study microparticle behavior in synthetic blood and mucus fluids under μg, using sensors and imaging to validate CFD models of spaceflight drug transport.

Life

A Kidney Stone in Microgravity — Examining Physical and Chemical Properties of Calcium Crystals Formed in Microgravity

Reese Laushot · UCF · **POSTER + TALK**

This project examines how microgravity affects calcium oxalate crystal growth, morphology, structural integrity, and composition. ISS-grown crystals will be compared with Earth controls to improve understanding of kidney stone risk during long-duration missions.

From Spectral Signatures to Freshness: Integrating Hyperspectral Imaging, Multi-Omics, and AI for Postharvest Quality

Prof. Tie Liu · UF · **TALK**

Our research addresses key challenges in Space Health, Nutrition, Postharvest Biology, and Space Sustainability by integrating hyperspectral imaging, metabolomics, and artificial intelligence to understand and predict crop responses in controlled environments.

Regolith to Rations: Cultivating Oyster Mushrooms in Martian Simulant for Food and Construction

Helen Navach · UCF · **POSTER + TALK**

This study examines whether oyster mushrooms can be cultivated in Martian regolith simulant as a closed-loop resource yielding edible protein, nutrient-conditioned regolith, and mycelium-based building materials. A controlled design varying amendment type assesses colonization, yield, soil transformation, and material density.

Effect of Increasing Nutrient Concentration on Ocimum Basilicum Seeds in Lunar Regolith Simulant

Ms. Sachita Saravanan · UCF · **POSTER + TALK**

This study explores how different concentrations of Hoagland's solution affect the growth and phenolic content of basil grown in lunar regolith simulant. Measuring the biomass of the basil seeds and their phenolic compounds will provide information for future space missions focusing on utilizing these plants for space medicine.

Subgrouping in Teams: Testing an Intervention for Mitigation

Allen Shorey · UCF · **POSTER + TALK**

A laboratory experiment examined the effectiveness of convergent and divergent subgrouping reduction strategies after a fast friends intervention. Results demonstrate that the strategies were potent at eliminating negative subgroup perceptions and harmful subgrouping effects.

Life

From UF to Zurich: Building the Next Generation of Space Life Scientists through Transatlantic Collaborations for Parabolic Flight Campaigns

Deep Thakkar · UF · **POSTER +** TALK

ACE2SPACE26 brought together 6 UF teams for 2 parabolic flights to investigate Bacterial Membrane Stability, Biomanufacturing Plastics, Enzymatic Reactions, Leukemia, Cardiac & Cancer Organoids, and Skeletal Muscle Physiology in short-term microgravity, showcasing student-led hardware and transatlantic collaborations to advance Space Life Sciences.

Ultra-Sensitive Molecular Detection with Frequency Combs: From Human Breath to Planetary Exploration.

Prof. Konstantin Vodopyanov · UCF · TALK

We apply mid-IR spectroscopy using frequency-combs (2005 Nobel Prize in Physics), for ultrasensitive identification of molecules at miniscule concentrations. Potential space-related applications include identifying lunar volatiles, biosignature gases on Mars and other planets, and trace biomarkers in human breath as indicators of exposure to space radiation.

Preparing Artemis astronauts for geologic fieldwork, sample collection, and lunar regolith analyses at the only terrestrial analog crater with basaltic ejecta

Dr. Shawn Wright · UCF · **POSTER +** TALK

Shocked basalts composing lunar impact crater ejecta blankets are useful samples for Artemis astronauts to retrieve. These can be dated isotopically to determine the shock age of the impactite and hence the impact crater. Fieldwork and sample analyses of the lone preserved terrestrial impact site in basalt, Lonar crater in India, will be discussed.

All Other Space Engineering

Polyhedral Gravitational Modelling Validated with FreeFlyer for Earth-like Bodies

Micah Boudreau · UCF · **POSTER +** TALK

A polyhedral gravity model was implemented in MATLAB, computing the exact gravitational field of a constant-density body from its vertex and face data. The method was validated on Earth-like ellipsoid meshes, with results checked against FreeFlyer gravity models. Various mesh resolutions were used to show convergence.

Advancing Melt Probes for the Exploration of Ocean Worlds

Amelia Brumfield · FIT · **POSTER +** TALK

Melt probes can penetrate ice on Ocean Worlds, but require significant advancements before a mission to Europa. This work focuses on analyzing novel nose designs, measuring the melt jacket, developing a function to include nose shape in the heat transfer models, and testing probe heat autonomy.

Bridging Micro-Scale Adhesion and Scalable DEM for Irregular, Charged Lunar Regolith

Matthew Crews · UCF · **POSTER +** TALK

A scalable DEM framework is developed for lunar regolith that combines vacuum AFM measurements, morphology-informed multisphere particles, calibrated adhesion laws, triboelectric charging, and long-range electrostatics. The approach links grain-scale measurements to simulations of irregular, charged regolith for lunar surface applications.

Quantum Inspired Imaging Through Atmospheric Turbulence with Photonic Lanterns: Benchtop Demonstration and Early On-Sky Results

Tara Crowe · UCF · **POSTER**

Modal-basis imaging techniques facilitated by photonic lanterns (PLs) offer a novel method of focal-plane wavefront estimation. We demonstrate our PL-based wavefront sensor to measure and correct optical wavefronts with high-order aberrations and achieve sub-diffraction limited imaging for ground-based astronomical observations through turbulence.

All Other Space Engineering

Lunar Scalable Outpost Power Evaluation (L-SCOPE): Effects of Illumination on Base Energy Balance in Polar Regions.

Andrew Dean · UCF · **POSTER + TALK**

Surviving the Lunar night is currently part of the highest-ranking NASA Civil Space Shortfall. We are creating a model to estimate the electrical and thermal power requirements of a Moon Base. Developing this model will help us understand the incident solar energy onto the Base.

Space Domain Awareness and Remote Sensing Below the Diffraction Limit

Prof. Stephen Eikenberry · UCF · **POSTER + TALK**

I will present our work on the application of photonic lanterns to quantum-inspired imaging below the classical diffraction limit, including laboratory demonstrations and progress on telescope deployment.

Advances in Resident Space Object Identification Using Unresolved Optical Space Imagery

Dylan Hernquist · ERAU · **POSTER + TALK**

We present an algorithm that identifies Resident Space Objects (RSOs) within optical space images by analyzing the locations of objects across a multi-frame image collect. The RSOs are distinguished from stars using distance-based clustering, and their tracks through the camera field of view are accurately plotted for two different collect modes.

Investigating strontium iridate (SIO) film growth for use in B-site doped strontium titanate (STO) memristor technology.

James Jackson · UCF · **POSTER + TALK**

Preliminary data on strontium iridate epitaxial thin films grown on strontium titanate substrate via Pulsed Laser Deposition, and results are analyzed via X-ray diffraction, and atomic force microscopy. Strontium stannate ceramic targets for use in pulsed laser deposition was also created.

All Other Space Engineering

Thermal Energy Storage Using Abundant Lunar Regolith for Lunar Habitats

Prof. Shin Young Jeong · UCF · **POSTER +** TALK

Sustained lunar operations require reliable energy storage. This work proposes stationary lunar-regolith packed-bed TES, using a closed gas loop to transfer heat between a nuclear reactor and sCO_2 power cycle, avoiding unreliable particle circulation under low gravity.

Utilizing Machine Learning to Identify Unknown Satellites

Derek Nguyen · UCF · **POSTER +** TALK

Satellite observations occur constantly and the method we use to sort their orbits as known or unknown is lagging behind as radars see less due to an increase in constellations. This study uses machine learning to see if it can track new satellite orbits off a few pings, advancing orbit tracking.

A Digital Twin for EagleCam 2: Lunar Imaging and Camera Modeling

Samuil Nikolov · ERAU · **POSTER +** TALK

EagleCam 2's digital twin combines lunar terrain, time-dependent celestial geometry, and a calibrated wide-field camera model. Six rendered views are reprojected through lens and sensor-response models to support camera design, mission planning, telemetry-driven operations, and image validation.

Affordance-Based Grasp Identification for Autonomous Satellite Capture Using Image Segmentation

Samantha Rogers · ERAU · **POSTER +** TALK

Investigating the integration of image segmentation and affordance-based perception to identify viable robotic grasping locations on non-cooperative satellites. This research aims to support autonomous capture through geometric analysis, contact-point selection, and simulation in NVIDIA Isaac Sim.

All Other Space Engineering

Traceable Refractive Index and Thickness Measurement Using a Comb-Referenced Tunable Laser

David Smith · UCF · **POSTER**

I will present a tunable-laser heterodyne interferometer referenced to a GPS-stabilized comb to simultaneously measure absolute optical refractive index and sample thickness with substantially lower uncertainty than existing methods, enabling future generations of precision space optical systems.

Investigating Focal Ratio Degradation in Optical Fibers with Motorized Iris Setup.

Intouch Srijumnong · UCF · **POSTER**

Focal ratio degradation (FRD) can reduce throughput in fiber-fed astronomical instruments. Using a motorized iris in the fiber's pupil plane and a camera recording transmitted light, we investigate FRD by comparing normalized encircled energy versus focal ratio for single-mode and multimode fibers.

Predicting Orbital Motion Using Physics-Informed Neural Networks (PINNs) for On-Board Autonomous Guidance and Navigation

Meagan Thatcher · UCF · **POSTER + TALK**

Current onboard guidance and navigation are accurate but lack adaptability. PINNs embed physics into learned models for adaptive orbital dynamics. This work develops a PINN to model unperturbed spacecraft motion.

Velocity and Position Estimation for Ice Melt Probes

Ishaben Trada · UCF · **POSTER**

We are developing an ice-penetrating probe to investigate probe performance under simulated Ocean World conditions. This study focuses on measuring probe position and descent velocity, evaluating sensing technologies, and identifying reliable methods for tracking probe motion during ice penetration.

THANK YOU TO OUR VOLUNTEERS

A heartfelt thank-you to the fantastic volunteers whose time and energy made the 3rd SpaceU Symposium possible.

Posters and Talks will be available on the SpaceU Symposium online repository at:

https://fsi.ucf.edu/spaceus3