



**HULC**  
HUMAN LANDER CHALLENGE

**2024 FORUM | JUNE 25-27**  
**HUNTSVILLE, ALABAMA**

# 2024 WELCOME MESSAGES



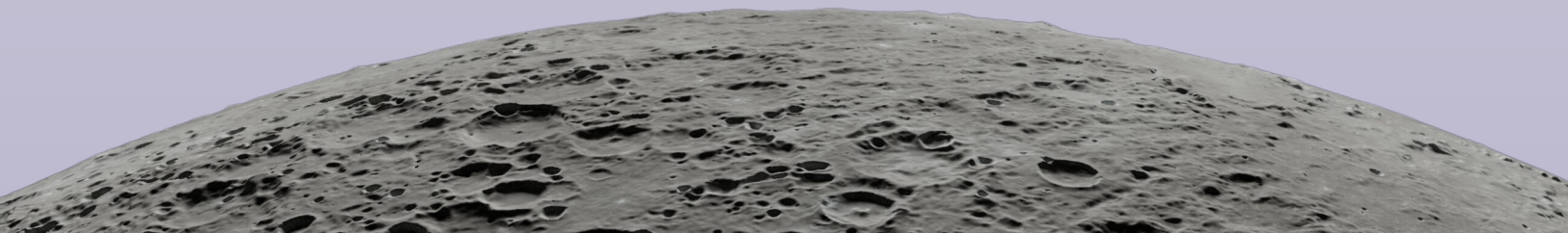
**JAMSHID SAMAREH**

**NASA's Langley  
Research Center**

**Welcome to NASA's 2024 Human Lander Challenge Forum!** We are thrilled to have you be part of this groundbreaking event. Your presence here in Huntsville, Alabama for the inaugural Forum is both an honor and an inspiration to all of us. We're excited about this year's theme: Mitigating Lunar-Plume Surface Interaction, one of our toughest challenges. Your innovative and revolutionary ideas hold immense potential in shaping and influencing future missions for the next generation of human space exploration. We truly believe that your participation in the 2024 Forum will not only provide you with a platform to showcase your talents, but also offer a unique opportunity to further your interests and gain invaluable experience within the aerospace industry.

This week, we have a panel of NASA and industry judges who have traveled here just to hear from YOU! How incredible is that? We cannot wait to see your passion and creativity in action as you present your concepts during your presentations and poster sessions over the next few days. Your unwavering dedication and hard work have not gone unnoticed by the subject matter experts on this year's Judging Panel and have brought you to this remarkable milestone. May this Forum be a place where you not only learn and grow but also create memories that will last a lifetime. This event provides an excellent chance for you to network with your fellow competitors, judges, and industry experts who share the same passions as you do. It's not just about work - we also want you to enjoy every moment of this experience!

**Thank you for being a vital part of NASA's 2024 Human Lander Challenge Forum.  
Best of luck to each of you!**







## 2024 FORUM GUIDELINES

**Participation:** Please review the Forum Agenda and be on time for all sessions. Participation in all HuLC Competition Forum events is mandatory and part of your evaluation.

**Personal Responsibility:** You are responsible for your actions, and accountable to your school policies. During your free time, please be respectful of the hotel property and guests (i.e., no loud parties in your rooms). Any complaints may result in disqualification of the team and immediate dismissal from the competition. While there is plenty of opportunity to have fun at the Forum, we just need to be mindful of NIA and NASA's reputation.

**Group Photo:** We will be taking a group photo during the Awards Ceremony Luncheon. Please wear your HuLC Competition Forum T-Shirt.

**Emergencies:** For medical emergencies, call 911.

- Nearest Hospital: Huntsville Hospital at 101 Sivley Road SW, Huntsville, AL 35801
- Nearest Urgent Care: Huntsville Hospital Urgent Care - Huntsville at 900 Bob Wallace Avenue SW, Unit #104, Huntsville, AL 35801

## NIA HULC PROGRAM TEAM

If you need assistance during the Forum, please contact a member of the Program Team:



**Robin Ford**  
Program Co-Lead  
240-472-4788



**Victoria "Tori" O'Leary**  
Program Co-Lead  
757-325-6926



**Stacy Dees**  
Program Manager  
757-218-8313



**Shelley Spears**  
Program Director  
404-229-6118



**Genevieve "Gen" Ebarle**  
Program Coordinator  
757-325-6999



# 2024 FORUM AGENDA

All Team and Guest Presentations will take place in Salons D, E & F.  
All times are listed in Central Time (CT).



## MONDAY, JUNE 24, 2024

**4:00 - 6:00 PM** **Team Check-In, Poster Set-Up & Networking Event**  
Grand Ballroom Pre-Function

## TUESDAY, JUNE 25, 2024

**7:15 - 8:20 AM** **Breakfast**  
Salons A, B & C

**7:15 - 8:15 AM** **Late Team Check-In & Poster Set-Up**  
Grand Ballroom Pre-Function

**8:30 - 8:45 AM** **Welcome Remarks**

**8:45 - 9:15 AM** **Guest Speaker: Tony Beaver**  
*HLS Mission Capabilities & Risk Reduction Lead  
NASA's Marshall Space Flight Center*

**9:20 - 10:05 AM** **Texas A&M University**  
*"Maroon Moon: Preliminary Surface Stabilization to Mitigate Lunar Plume Surface Interaction"*  
Advisors: Dr. Jean-Louis Briaud & John Connolly

**10:05 - 10:20 AM** **Morning Break**  
Grand Ballroom Pre-Function

**10:20 - 11:05 AM** **University of Illinois, Urbana-Champaign**  
*"HINDER: Holistic Integration of Navigational Dynamics for Erosion Reduction"*  
Advisors: Dr. Laura Villafaña Roca & Nicolas Rasmont

**11:10 AM - 12:15 PM** **Colorado School of Mines**  
*"Prudent Landers: Fresnel Lens Sintered Lunar Regolith Landing Pad"*  
Advisors: Dr. Angel Abbud-Madrid, Mark Florida & David Purcell

**12:15 - 1:30 PM** **Lunch**  
Salons A, B & C

**1:30 - 2:15 PM** **Texas State University**  
*"Numerical Simulation and Physical Validation of Regolith Ejecta During Plume Surface Interaction"*  
Advisor: Dr. Bin Xiao

**2:20 - 3:05 PM** **Ohio Northern University**  
*"HuLC Smash"*  
Advisor: Dr. Louis DiBerardino

**3:05 - 3:20 PM** **Afternoon Break**  
Grand Ballroom Pre-Function

**3:20 - 4:05 PM** **University of Michigan**  
*"ARC-LIGHT: Algorithm for Robust Characterization of Lunar surface Imaging for Ground Hazards and Trajectory"*  
Advisors: Dr. Mirko Gamba & Dr. Chris Ruf

**4:05 - 4:10 PM** **Wrap-Up & Announcements**

**4:15 - 5:30 PM** **Poster Session for Day 1 Teams**  
Grand Ballroom Pre-Function

**6:30 - 8:00 PM** **Group Dinner**  
Salons A, B & C

## WEDNESDAY, JUNE 26, 2024

**7:30 - 8:45 AM** **Breakfast**  
Salons A, B & C

**8:55 - 9:00 AM** **Welcome & Announcements**

**9:00 - 9:45 AM** **University of Colorado, Boulder**  
*"Lunar Surface Assessment Tool (LSAT): A Simulation of Lunar Dust Dynamics for Risk Analysis"*  
Advisor: Dr. James Nabity

**9:50 - 10:35 AM** **The College of New Jersey**  
*"TCNJ Adaptable Regolith Retention Program (TARRP)"*  
Advisor: Dr. Mohammed Alabsi

**10:35 - 10:50 AM** **Morning Break**  
Grand Ballroom Pre-Function

**10:50 - 11:35 AM** **Texas A&M University**  
*"Synthetic Orbital Landing Area for Crater Elimination (SOLACE)"*  
Advisor: Dr. Helen Reed

**11:40 AM - 12:25 PM** **Embry-Riddle Aeronautical University**  
*"Plume Additive for Reducing Surface Ejecta and Cratering (PARSEC)"*  
Advisor: Dr. Siwei Fan

**12:25 - 1:45 PM** **Lunch**  
Salons A, B & C

**1:45 - 2:30 PM** **University of California, San Diego**  
*"MOON Pads: Microwave-Sintering Operations of Nanophase-Iron Pads"*  
Advisors: Dr. Amy Eguchi, Dr. Zahra Sadeghizadeh & Dr. Ross Turner

**2:35 - 3:20 PM** **Embry-Riddle Aeronautical University**  
*"Ceramic Research Advancement Technology at Embry-Riddle (CRATER)"*  
Advisor: Dr. Seetha Raghavan

**3:20 - 3:25 PM** **Wrap-Up & Announcements**

**3:25 - 3:40 PM** **Afternoon Break**  
Grand Ballroom Pre-Function

**3:45 - 5:00 PM** **Poster Session for Day 2 Teams**  
Grand Ballroom Pre-Function

**5:00 PM** **Adjourn & Free Evening**

## THURSDAY, JUNE 27, 2024

**7:30 - 8:45 AM** **Breakfast**  
Salons D, E & F

**9:00 AM - 12:00 PM** **U.S. Space & Rocket Center Trip**  
1 Tranquility Base, Huntsville, AL 35805

**1:00 - 2:45 PM** **Awards Ceremony Luncheon**  
Salons D, E & F

**3:00 PM** **Adjourn**

Share the Livestream Link: <https://vimeo.com/showcase/hulc>



# ON SITE JUDGES

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**SPONSOR**

## JAMSHID SAMAREH

is a senior research aerospace engineer in the Vehicle Analysis Branch of NASA's Langley Research Center. His research interests are in Entry, Descent, and Landing, mass modeling, multidisciplinary analysis and design optimization, fluid-structure interaction, geometry modeling, and shape optimization.



**2024 CHAIR**

## ESTHER LEE

earned her B.S. and M.S. degrees in Mechanical & Aerospace Engineering from Rutgers University and University of California, Davis. She began her career at NASA's Langley Research Center in 2014, and has made contributions to the Space Launch System, crew health, Human Lander System, and more. Her experiences span the areas of aerothermodynamics, model-based systems engineering, flight mechanics, and database/tool integration. She currently leads the navigation sensors technology assessment capability team and is passionate about expanding the capability to enable decision-making in technology investments. Outside of work, Esther can be found unleashing her creativity and experimenting across art mediums, tending to her garden when the weather is right, and engaging in STEM outreach.

## LORA DISHONGH

was invited to the University of Houston as a National Merit Scholar. She earned a Bachelor of Science in Mechanical Engineering, Summa Cum Laude, before joining the US Navy to serve as an instructor at the Naval Nuclear Power Training Command. After one tour of duty, she returned to the Houston area to pursue a career at NASA's Johnson Space Center. Lora has worked in various project and systems engineering roles in the twenty years since. She has built hardware for biological monitoring and exercise activities aboard the International Space Station, written test requirements and performed integration activities for the Orion Multi-Purpose Crew Vehicle, and led teams of various sizes with far-flung membership. Lora currently works for Booz Allen Hamilton, and serves NASA's Lunar Architecture Team as the Artemis IV Surface Planning Analysis Lead and curator of the publicly-released Lunar Surface Data Book.



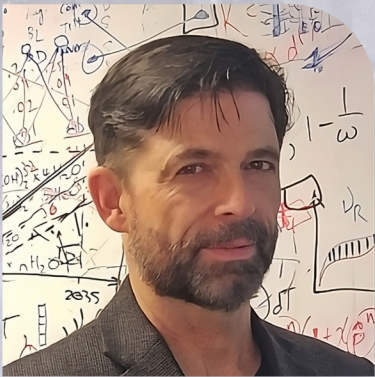
# MARK LEWIS

received a B.S. in Electrical Engineering from Cleveland State University. Mr. Lewis is a systems engineer at NASA Kennedy Space Center (KSC) and has over 30 years of experience at NASA working on numerous research and spaceflight projects at Glenn Research Center (GRC) and at KSC. He has research experience in the development of damage detection and health management systems, and various types of gas sensors for use in launch system operations, spaceflight experiments, and biomedical applications. His flight hardware development experience includes satellite servicing and microgravity physical science experiments. Mr. Lewis is listed as an inventor on seven patents and received the NASA Silver Achievement Medal in 2018.



# DR. PHILIP METZGER

is a planetary scientist and the director of the Stephen W. Hawking Center for Microgravity Research and Education at the University of Central Florida. He worked at NASA's Kennedy Space Center for about 30 years, where he co-founded the KSC Swamp Works. He performs research related to solar system exploration: lunar mining, soil mechanics, rocket exhaust interactions with planetary surfaces, etc. He received the astronaut's Silver Snoopy award in 2010, was selected as the Kennedy Space Center's NASA Scientist/Engineer of the Year for 2011, received the ASCE Aerospace Division's Outstanding Technical Contribution Award for 2016, and became a NASA NIAC Fellow in 2020. In 2021, The International Astronomical Union (IAU) named asteroid 36329 Philmetzger (2000 LU35) after him, citing his research into rocket exhaust blowing soil and efforts to protect the Apollo heritage sites from those effects.



# DR. MANISH MEHTA

is a subject matter expert within the Aerosciences Branch at NASA's Marshall Space Flight Center in Huntsville, Alabama. His main area of focus is aerothermodynamics, base aerodynamics and gas-granular flow physics and has been working in these disciplines for the last 20 years. Dr. Mehta has worked multiple technical disciplines within aerosciences for the Space Launch System (SLS) Program and currently is the induced environment discipline lead engineer for the Human Landing System (HLS) Program. He received his doctorate in engineering from the University of Michigan in 2010.





# VIRTUAL JUDGES

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**TECHNICAL LEAD**

## DR. ASHLEY KORZUN

is an

Aerospace Engineer at NASA's Langley Research Center and Principal Investigator for NASA's Plume-Surface Interaction ground testing and capability development. Her primary specialization is in entry, descent, and landing aerosciences and systems, with an emphasis on technology development for propulsive descent and landing on the Earth, Moon, and Mars. Dr. Korzun has served as the Aerodynamics Lead for the successful InSight Mars lander mission and the LOFTID technology demonstration mission. She holds a B.S. in Aerospace Engineering from the University of Maryland and a M.S. and Ph.D. in Aerospace Engineering from Georgia Tech.



## SAMANTHA HARRIS

spent her

childhood in Cincinnati, Ohio before moving to Alabama to pursue an undergraduate degree in Industrial and Systems engineering at the University of Alabama in Huntsville. As an undergrad, she happened upon a Pathways Internship with NASA's Marshall Space Flight Center that eventually led to her first job chatting with astronauts aboard the International Space Station. While working various roles in flight control and ground team training for the ISS program, she earned a Master's degree in Engineering Management. Since leaving the ISS program, she has served in project management functions for a variety of space technology development projects including green propulsion, deployable in-space power generation, Cryogenic Fluid Management and Plume Surface Interaction.

2024 JUDGING PANEL







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HUMAN LANDER CHALLENGE

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The Human Lander Challenge is sponsored by NASA's Exploration Systems Development Mission Directorate's (ESDMD's) Human Landing System (HLS) Program Office and managed by the National Institute of Aerospace.