



HUMAN LANDER 2025 CHALLENGE COMPETITION FORUM

2025 FORUM WELCOME MESSAGE



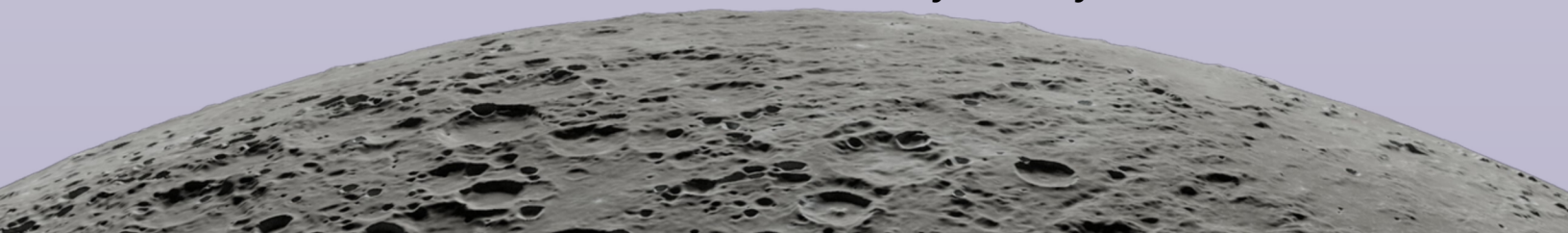
On behalf of NASA's Human Landing Systems Program Office, welcome to NASA's 2025 Human Lander Challenge Forum - HuLC! We are delighted to welcome you to Huntsville, Alabama to attend this exceptional event, where innovation, creativity, and collaboration come together in a powerful way. Your presence for the 2nd annual HuLC Forum is a testament to the talent, determination, and vision that you bring to the future of space exploration.

This year, we tackle a bold and exciting challenge: Advanced Cryogenics for HLS applications. It's a complex issue, but we believe your groundbreaking ideas will play a pivotal role in shaping the next era of human missions to the Moon. The work you're doing here is not just about solving technical challenges; it's about pushing boundaries and setting new standards for what's possible in aerospace.

We are inspired by your commitment to our mission. Over the next few days, you'll have the chance to present your work to an incredible panel of NASA and industry experts who are eager to learn more about your concepts. The potential impact of your solutions is boundless, and we're looking forward to seeing how your passion, ingenuity, and hard work come to life during your presentations and the poster session. Remember, this Forum is not just an opportunity to showcase your ideas – it's also a space for you to connect, learn, and grow. Network and collaborate with fellow attendees, and take full advantage of the valuable experiences that will shape your journey in the aerospace industry. And don't forget: in addition to the hard work, there's fun and camaraderie to be found along the way.

Thank you for being part of this extraordinary event, and for your contribution to the future of space exploration. We believe in your vision, and we can't wait to see the incredible things you'll accomplish.

Best of luck to each and every one of you!





2025 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 t-shirt for this photo.

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:



SHELLEY SPEARS

240-472-4788



STACY DEES

757-218-8313



**VICTORIA "TORI"
O'LEARY**

757-325-6926



**GENEVIEVE
"GEN" EBARLE**

757-325-6999



AMY MCCLUSKEY

757-592-7211



2025 FORUM AGENDA

All Team and Guest Presentations will take place in Salon ABC.
All times are listed in Central Time (CT).



MONDAY, JUNE 23

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

TUESDAY, JUNE 24

7:45 – 8:55 AM **Breakfast**
Salon DEF

7:45 – 8:55 AM **Late Team Check-In & Poster Set-Up**
Grand Ballroom Pre-Function

8:00 – 8:45 AM **Judges' Meeting**
Satellite

9:00 – 9:15 AM **Welcome Remarks**

9:15 – 9:45 AM **Keynote Speaker: Jeremy Kenny**
Manager of the Technology Demonstration Missions (TDM) Program Office
NASA's Marshall Space Flight Center

9:50 – 10:35 AM **University of Illinois, Urbana-Champaign**
ECLIPSE: Efficient Cryogenic Low Invasive Propellant Supply Exchange
Advisor: Vishwanath Ganesan

10:35 – 10:50 AM **Morning Break**
Salon DEF

10:50 – 11:35 AM **The Ohio State University**
Autonomous Magnetized Cryo-Couplers with Active Alignment Control for Propellant Transfer (AMCC-AAC)
Advisor: John Horack

11:40 AM – 12:25 PM **Jacksonville University**
Cryogenic Complex: Cryogenic Tanks and Storage Systems – On the Moon and Cislunar Orbit
Advisors: Gayl Angela Masson, Brian Kopp, James Simak, and Reza Sarraf

12:25 – 1:30 PM **Lunch**
Salon DEF

1:30 – 2:15 PM **Colorado School of Mines**
MAST: Modular Adaptive Support Technology
Advisor: Jennifer Erickson

2:20 – 3:05 PM **The College of New Jersey**
Cryogenic Orbital Siphoning System (CROSS)
Advisor: Mohammed Alabsi

3:05 – 3:20 PM **Afternoon Break**
Salon DEF

3:20 – 4:05 PM **Embry-Riddle Aeronautical University, Prescott**
Electrical Capacitance to High-resolution Observation (ECHO)
Advisors: Siwei Fan and Ron Madler

4:10 – 4:55 PM **California State Polytechnic University, Pomona**
THERMOSPRING: Thermal Exchange Reduction Mechanism using Optimized SPRING
Advisor: Frank Chandler

4:55 – 5:00 PM **Wrap-Up & Announcements**

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

WEDNESDAY, JUNE 25

7:30 – 8:25 AM **Breakfast**
Salon DEF

8:30 – 8:35 AM **Welcome & Announcements**

8:35 – 9:20 AM **Old Dominion University**
Structural Tensegrity for Optimized Retention in Microgravity (STORM)
Advisor: Colin Britcher

9:25 – 10:10 AM **Jacksonville University**
Cryogenic Fuel Storage and Transfer: The Human Interface – Monitoring and Mitigating Risks
Advisors: Gayl Angela Masson, Brian Kopp, James Simak, and Reza Sarraf

10:10 – 10:25 AM **Morning Break**
Salon DEF

10:25 – 11:10 AM **Texas A&M University**
Next-generation Cryogenic Transfer and Autonomous Refueling (NeCTAR)
Advisors: John Connolly and Shirish Pandam

11:15 AM – 12:00 PM **Massachusetts Institute of Technology**
THERMOS: Translunar HEat Rejection and Mixing for Orbital Sustainability
Advisors: George Lordos, Olivier de Weck, and Jeffrey Hoffman

12:00 – 1:10 PM **Lunch**
Salon DEF

1:10 – 1:55 PM **Washington State University**
CYPRESS (CrYogenic Performance REFueling Safety System) Coupler for Liquid Hydrogen Transfer
Advisor: Jacob Leachman

1:55 – 2:00 PM **Wrap-Up & Announcements**

2:00 – 5:00 PM **Poster Session for All Teams**
Grand Ballroom Pre-Function

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

8:00 PM **Judges' Final Scores Due**

THURSDAY, JUNE 26

6:45 AM **FNs Pick Up Breakfast & Board Tour Van**
Salon DEF

7:00 AM **FN Van Departs for Badging Office**

7:30 – 8:30 AM **Breakfast**
Salon DEF

8:00 – 11:00 AM **Judges' Deliberation Meeting**
Satellite

8:30 AM **Board Buses for NASA MSFC Tour**

8:45 AM **Buses Depart for NASA MSFC Tour**

9:00 AM – 12:00 PM **NASA MSFC Tour**

1:00 – 2:45 PM **Awards Ceremony Luncheon**
Salon ABC

2:45 PM **Adjourn**



2025 CO-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. Her contributions span a diverse range of space exploration projects, including the Space Launch System, Human Research Program, and Human Lander System. She emphasizes a systems thinking approach in her work, considering the broader implications and interdependencies within complex projects while leveraging her knowledge in flight mechanics, aerothermodynamics, and model-based systems engineering. Drawing on her experience as former team lead of the navigation sensors technology assessment team and her current role as Proposal Manager, Esther is dedicated to fostering innovation and informed decision-making in technologies that advance space exploration and improve life on Earth. Beyond her professional endeavors, she enjoys exploring her creativity through art, gardening, and engaging in STEM outreach. She is excited to witness the ingenuity and talent of the HuLC students



TECHNICAL LEAD & 2025 CO-CHAIR

JUAN VALENZUELA

received his B.S. and M.S. in Mechanical Engineering from the University of Texas at El Paso. He has been an aerospace engineer for NASA since 2012. During his 12 years at NASA, he has served as vacuum chamber test engineer, cryogenic fluids analyst and cryogenic fluid management product lead, responsible for the technology development of in-space cryogenic hardware. He currently serves as the Human Landing Systems (HLS) main propulsion systems (MPS) sub-system lead, responsible for overseeing insight on non-main engine propulsion systems of the next lunar landers.

**MICHAEL DIPIRRO**

joined NASA's Goddard Space Flight Center in 1980 after receiving a PhD in Low Temperature Physics and serving one year as a post-doc at NIST in Gaithersburg. He has worked on a number of NASA's cryogenic astrophysics missions including the Cosmic Background Explorer (1980-1990), Spitzer Space Telescope (1985-2003), and James Webb Space Telescope (2006-2021). In between he was the Principal Investigator for the Superfluid Helium On-Orbit Transfer Flight Demonstration (1984-1993) which successfully demonstrated the microgravity transfer of liquid helium in the superfluid state. He also has several patents on low temperature technology as well as over 100 published papers on the subject.

MONICA GUZIK

is the Chief Engineer of the Gateway Power and Propulsion Element (PPE) at the NASA Glenn Research Center (GRC) in Cleveland, Ohio. She is a graduate of Rose-Hulman Institute of Technology with a B.S. in Chemical Engineering and a minor in German Language. Prior to her role on PPE, Monica served a 14-month detail within the Office of the Chief Engineer at NASA Headquarters as the Space Technology Mission Directorate (STMD) Deputy Chief Engineer. She has also served as the Chief Engineer for the Fission Surface Power project, the Hybrid Thermally Efficient Core (HyTEC) project, and the Flow Boiling and Condensation Experiment (FBCE) for the International Space Station. Prior to joining the Chief Engineer's office, Monica had over ten years of experience in the Fluids and Cryogenics Systems branch at GRC, where she focused on in-space cryogenic fluid management and fuel cell power systems. Monica is currently a deputy on the NASA Engineering and Safety Center's Cryogenics Technical Discipline Team. She was honored by the Agency with the NASA Silver Snoopy Award in 2022 for her work on FBCE, as well as the Early Career Achievement Medal in 2016 and the Silver Achievement Medal in 2017. In her free time, she enjoys participating in community STEM outreach, playing soccer, traveling, visiting theme parks, and enjoying Cleveland's extensive music scene.



WESLEY JOHNSON

received a B.S. in aerospace engineering from Auburn University in 2007 and a master's degree from the University of Central Florida in 2010. Mr. Johnson began his career at NASA Kennedy Space Center as a Cooperative Education Student in 2004 working in the Cryogenics Test Laboratory where he spent over nine years developing advanced cryogenic technologies as well as trouble shooting problems on the Space Shuttle. He moved to NASA Glenn Research Center in 2014 to continue his research in cryogenic fluid management where he is the Cryogenics Team Lead in the Fluid and Cryogenic Systems Branch. His current research interests include thermal characterization of insulations as systems as well as collaboration with multiple projects focusing on cryogenic fluid system design, analysis, and testing. He was the Principle Investigator for the large scale liquid hydrogen testing effort: the Structural Heat Intercept, Insulation, and Vibration Evaluation Rig (SHIIVER) and the oxygen liquefaction demonstration Cryogenic Fluid In-situ Liquefaction for Landers (CryoFILL).





ALI KASHANI

has over 40 years of experience in thermal sciences. His work includes research and development of reduced and zero boil-off propellant systems, pulse tube cryocoolers, low-temperature regenerators, magnetic and helium dilution refrigerators. He is currently supporting the development of cryogenic technologies for NASA's Human Landing Systems. He has worked on several NASA flight projects: Starling, VIPER, SHOOT, GP-B, SOFIA, BioSentinel, Astrobee, and Astro-H. He is a member of NASA Engineering & Safety Center Technical Discipline Team for cryogenics.



REID RUGGLES

is the NASA HLS Propulsion Discipline Lead Engineer, leading the NASA propulsion engineering team in evaluating both SpaceX's HLS Starship and Blue Origin's Blue Moon propulsion system designs and procedures to safely land the next American astronauts on the lunar surface and establish a sustained presence on the Moon. The HLS Propulsion Team includes main engines, main propulsion systems / cryogenic fluid management, reaction and attitude control systems, gas storage and generation systems, and all supporting lines, valves, and other components. Reid received his B.S. in Aerospace Engineering from The University of Alabama and his M.S. in Aerospace Engineering from Georgia Tech. Prior to joining the HLS team in 2022, Reid supported NASA's Commercial Crew Program as a Main Propulsion Systems Engineer for Falcon 9 and Atlas V and served as the CCP Deputy Lead Engineer for Falcon 9. He directly supported the return of human launch capability to the United States with SpaceX's DM-2 mission, as well as certification, maintenance, and flight operations of reused Falcon 9 first stage boosters starting with the Crew-2 mission.



MARK WOLLEN

graduated from CWRU with MS/BS degrees in Mechanical and Aerospace Engineering in 1980/82. After an early period at General Dynamics in San Diego, working Atlas/Centaur evolution, National Aero Space Plane (NASP), and other advanced space programs, he went on to co-found Innovative Engineering Solutions (currently serving as the Chief Technical Officer), and has spent most of his career working as a consultant on cryogenic propellant management techniques for space launch vehicles. Recognized areas of expertise include: cryogenics and low/zero gravity fluid mechanics, free surface flows, propellant tank thermodynamics, cryogenic propulsion systems, and testing techniques and specialized instrumentation for these topics. Over the last 40+ years Mr. Wollen has contributed to various design and development activities for most of the liquid propellant launch vehicle systems currently in use in the United States.



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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.