



Lunar Surface Innovation

C O N S O R T I U M

LSIC Dust Mitigation Focus Group

Monthly Meeting

October 21, 2021



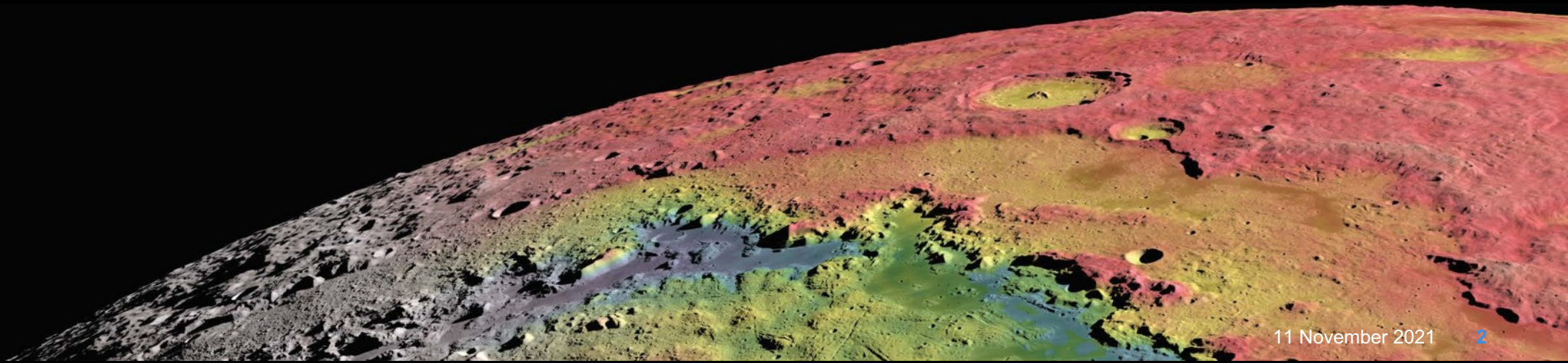
JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

Dr. Jorge Núñez
Senior Scientist
Space Exploration Sector

Facilitator: DustMitigation@jhuapl.edu

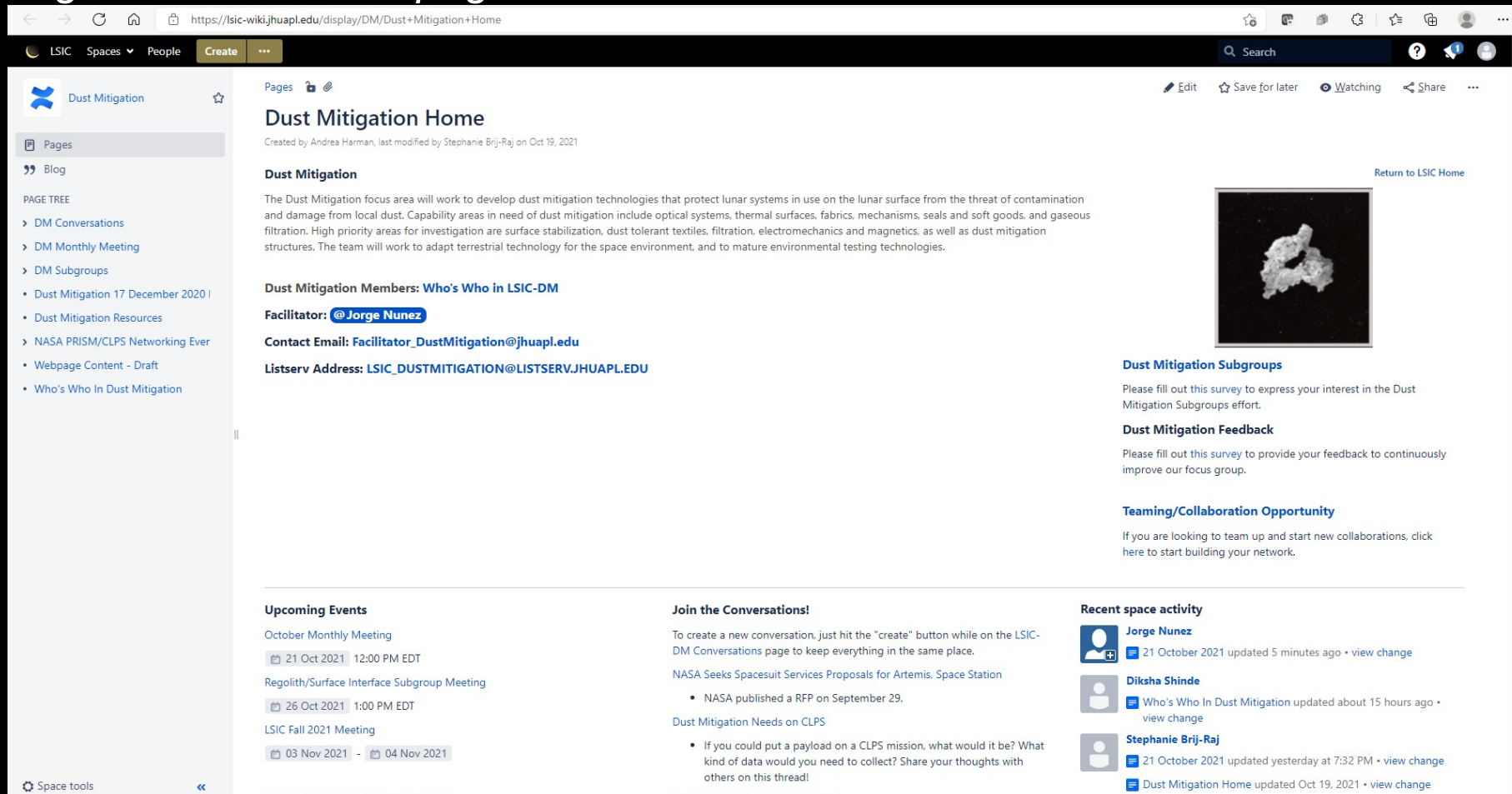
Agenda

- Welcome, LSIC and Focus Group Updates
- Upcoming Opportunities and Meetings
- Quick DM Updates
 - Who's Who in Dust Mitigation
 - Dust Mitigation subgroups survey
 - What is next for Dust Mitigation FG survey
- Featured Presentation by Dr. Kristen John, NASA Johnson Space Center
 - "NASA-STD-1008: Dust Testing Standard Overview"
- NASA-STD-1008 Discussion



LSIC Dust Mitigation Confluence Site

- Please contact Andrea Harman (ams573@alumni.psu.edu) to get set up with an account!
- *Dust Mitigation Discussion page and wiki*



The screenshot shows the Confluence page for the Dust Mitigation Home. The page includes a navigation sidebar on the left with options like 'Pages', 'Blog', and 'PAGE TREE'. The main content area features the title 'Dust Mitigation Home', a description of the focus area, and contact information for the facilitator, Jorge Nunez. There are also sections for 'Upcoming Events', 'Join the Conversations!', and 'Recent space activity'.

Dust Mitigation Home
Created by Andrea Harman, last modified by Stephanie Brij-Raj on Oct 19, 2021

Dust Mitigation
The Dust Mitigation focus area will work to develop dust mitigation technologies that protect lunar systems in use on the lunar surface from the threat of contamination and damage from local dust. Capability areas in need of dust mitigation include optical systems, thermal surfaces, fabrics, mechanisms, seals and soft goods, and gaseous filtration. High priority areas for investigation are surface stabilization, dust tolerant textiles, filtration, electromechanics and magnetics, as well as dust mitigation structures. The team will work to adapt terrestrial technology for the space environment, and to mature environmental testing technologies.

Dust Mitigation Members: Who's Who in LSIC-DM
Facilitator: @Jorge Nunez
Contact Email: Facilitator_DustMitigation@jhuapl.edu
Listserv Address: LSIC_DUSTMITIGATION@LISTSERV.JHUAPL.EDU

Upcoming Events
October Monthly Meeting
21 Oct 2021 12:00 PM EDT
Regolith/Surface Interface Subgroup Meeting
26 Oct 2021 1:00 PM EDT
LSIC Fall 2021 Meeting
03 Nov 2021 - 04 Nov 2021

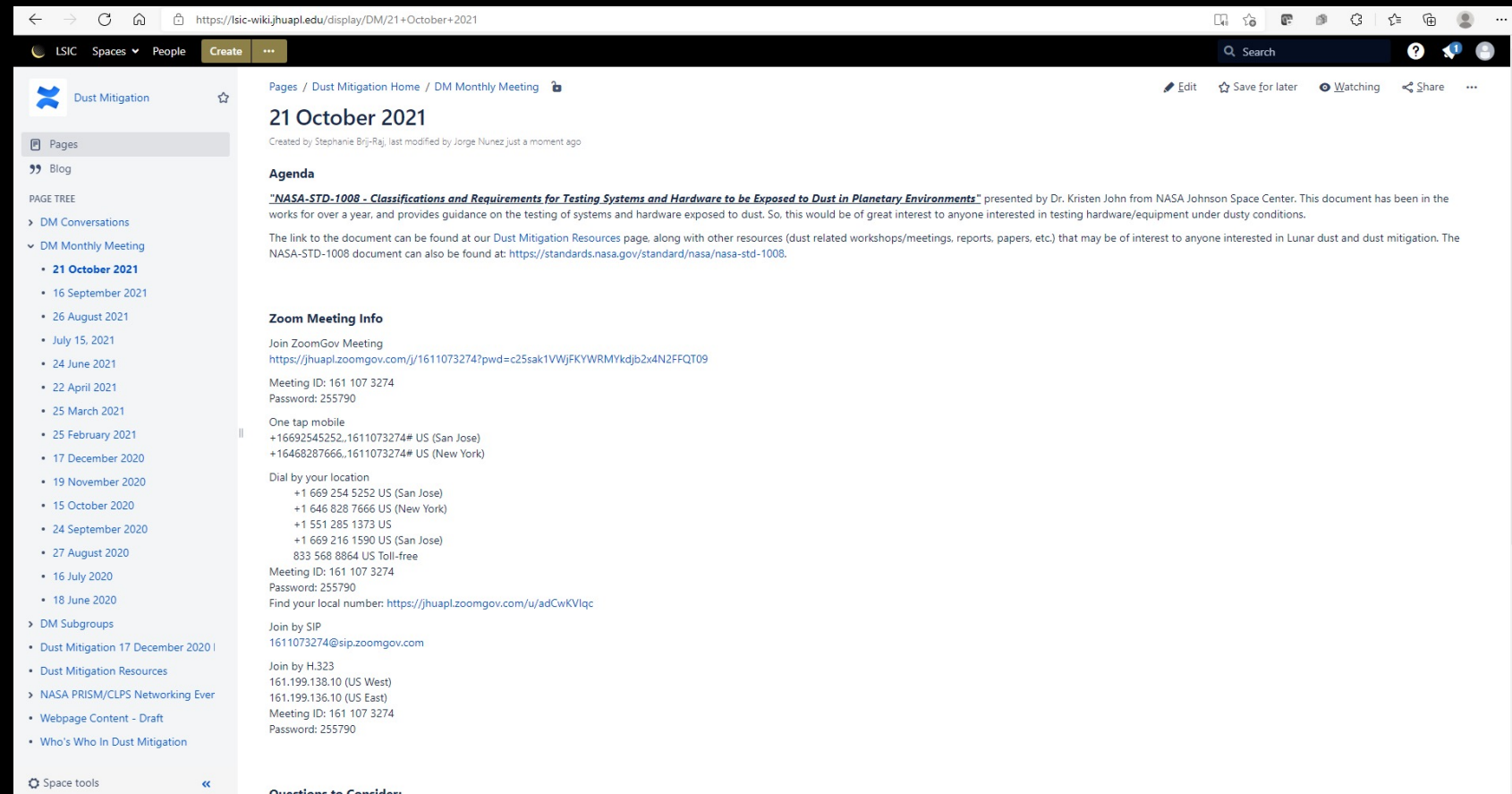
Join the Conversations!
To create a new conversation, just hit the "create" button while on the LSIC-DM Conversations page to keep everything in the same place.
NASA Seeks Spacesuit Services Proposals for Artemis, Space Station
• NASA published a RFP on September 29.
Dust Mitigation Needs on CLPS
• If you could put a payload on a CLPS mission, what would it be? What kind of data would you need to collect? Share your thoughts with others on this thread!

Recent space activity
Jorge Nunez
21 October 2021 updated 5 minutes ago • view change
Diksha Shinde
Who's Who In Dust Mitigation updated about 15 hours ago • view change
Stephanie Brij-Raj
21 October 2021 updated yesterday at 7:32 PM • view change
Dust Mitigation Home updated Oct 19, 2021 • view change

Join the Discussion on Confluence Site

- Please contact Andrea Harman (ams573@alumni.psu.edu) to get set up with an account!
- *Dust Mitigation Discussion page and wiki*

- 1. Sign-in to add a comment
- 2. Add comment at bottom of page
- 3. You can comment before, during, or after today's meeting



The screenshot shows a Confluence page for a meeting on October 21, 2021. The page is titled "21 October 2021" and is part of the "Dust Mitigation" space. The agenda item is titled "NASA-STD-1008 - Classifications and Requirements for Testing Systems and Hardware to be Exposed to Dust in Planetary Environments". The page also includes Zoom meeting information and SIP/H.323 join instructions.

Pages / Dust Mitigation Home / DM Monthly Meeting

21 October 2021

Created by Stephanie Brij-Raj, last modified by Jorge Nunez just a moment ago

Agenda

"NASA-STD-1008 - Classifications and Requirements for Testing Systems and Hardware to be Exposed to Dust in Planetary Environments" presented by Dr. Kristen John from NASA Johnson Space Center. This document has been in the works for over a year, and provides guidance on the testing of systems and hardware exposed to dust. So, this would be of great interest to anyone interested in testing hardware/equipment under dusty conditions.

The link to the document can be found at our [Dust Mitigation Resources](#) page, along with other resources (dust related workshops/meetings, reports, papers, etc.) that may be of interest to anyone interested in Lunar dust and dust mitigation. The NASA-STD-1008 document can also be found at: <https://standards.nasa.gov/standard/nasa/nasa-std-1008>.

Zoom Meeting Info

Join ZoomGov Meeting
<https://jhuapl.zoomgov.com/j/1611073274?pwd=c25sak1VWJfKYWRMYkdjbj2x4N2FFQj09>

Meeting ID: 161 107 3274
Password: 255790

One tap mobile
+16692545252,,1611073274# US (San Jose)
+16468287666,,1611073274# US (New York)

Dial by your location
+1 669 254 5252 US (San Jose)
+1 646 828 7666 US (New York)
+1 551 285 1373 US
+1 669 216 1590 US (San Jose)
833 568 8864 US Toll-free

Meeting ID: 161 107 3274
Password: 255790
Find your local number: <https://jhuapl.zoomgov.com/u/adCwKVIqc>

Join by SIP
1611073274@sip.zoomgov.com

Join by H.323
161.199.138.10 (US West)
161.199.136.10 (US East)
Meeting ID: 161 107 3274
Password: 255790

Questions to Consider:

Updates and Communications

- Monthly LSIC newsletter – New edition came out October 4
 - <http://lsic.jhuapl.edu/Resources/>
- Mailing list
 - The listserv goes to all participants. Use with caution. But feel free to use!
 - Please make sure to add LSIC_DUSTMITIGATION@LISTSERV.JHUAPL.EDU to safe senders list.
 - If we need smaller, focused lists we can set those up
- Updates to the webpage - <http://lsic.jhuapl.edu/Focus-Areas/Dust-Mitigation.php>
 - Notes, slides, recordings from telecons posted here
- Wiki is ready!
 - Confluence is free to you and available to all registered LSIC members
 - To request an account, please email Andrea Harman: ams573@alumni.psu.edu
- Lightning Talks at monthly focus group meetings
 - Anyone can volunteer to give a featured talk (~15 mins)
 - Email me if you want to sign up: Facilitator_DustMitigation@jhuapl.edu

Follow the Code of Conduct for all Focus Group communications

http://lsic.jhuapl.edu/Resources/files/Code%20of%20Conduct_05222020.pdf

LSIC Activities

Recent and Upcoming LSIC Meetings and Workshops (<http://lsic.jhuapl.edu/News-and-Events/>)

- LSIC EE Regolith/Surface Interface subgroup meeting (10/26) at 1 PM ET
 - Presentation by Dr. Ryan Zeigler, NASA's Apollo Sample Curator
 - Join Zoom Meeting: <https://us06web.zoom.us/j/94518674581?pwd=akpqR1k5OHF2VTg4TIRYMVhuTDVvQT09>
- LSIC Fall Meeting (11/3-4), Bowie State University, MD
 - Virtual Registration Deadline Closes October 26th
 - <https://lsic.jhuapl.edu/News-and-Events/Agenda/index.php?id=148>
- LSIC Dust Mitigation Focus Group Meeting (11/18)
- LSIC Dust Mitigation Focus Group Meeting (12/16)

Other Recent and Upcoming Dust Mitigation Related Workshop and Meetings

- LSSW #12: Future Landing Sites and Capabilities for Future CLPS Deliveries (11/18)
 - Abstracts were Due October 8th: <https://www.hou.usra.edu/meetings/lunarsurface2020/>
- AIAA ASCEND 2021 Meeting in Las Vegas, NV (11/15-17)
 - “Who Did It Best? Seven Unique Lunar Dust Mitigation Technologies, and NASA Update on Lunar Dust Mitigation Strategies” – 11/16

SpaceTech-REDDI-2022: NIAC Phase II

- Space Technology Research, Development, Demonstration, and Infusion-2022 (SpaceTech-REDDI-2022): NASA Innovative Advanced Concepts (NIAC) Phase II
- Not to exceed \$600K for 2yrs (\$300K per year)
- Notice of Intent Due October 21, 2021 (Today)
- Proposal Due December 15, 2021
- Selection Date February 9, 2022
- Award Date March 31, 2022
- <https://nspires.nasaprs.com/external/solicitations/summary!init.do?sollId={05B1A3ED-79C4-C9DE-8167-1CE2403016E4}&path=open>



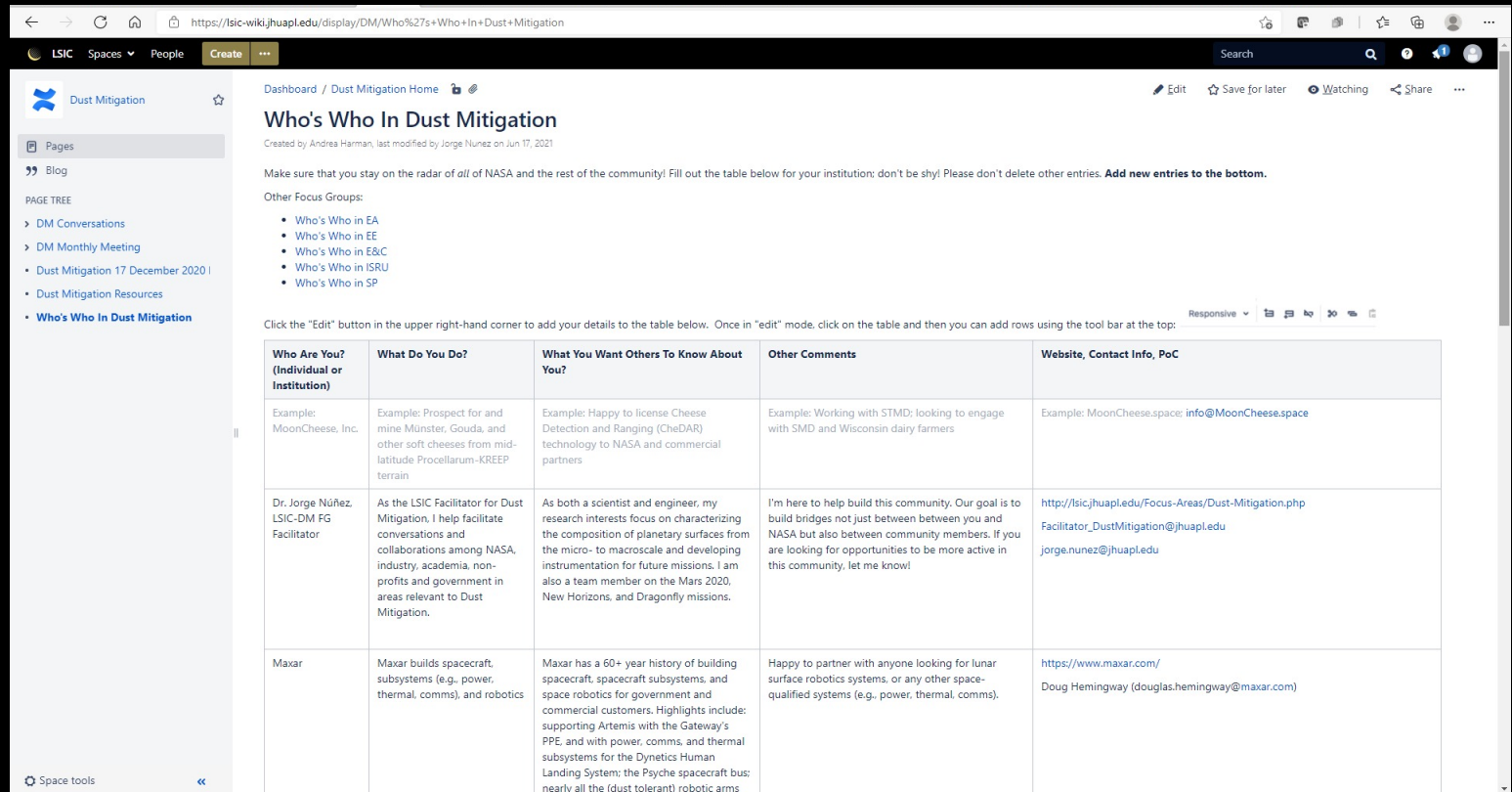
Over the Dusty Moon Challenge

- Design and Build a Regolith Transport Solution for the Moon
- 1. September 24, 2021 - Webinar
 - Q&A session
- 2. November 29, 2021 - Deadline for entries
 - Must be submitted by 11:59 pm Mountain Time
- 3. December 20, 2021 - Notification to invitees
 - Teams notified if they are invited to compete in the in-person challenge
- 4. June, 2022 - In-person challenge
 - Hosted by Colorado School of mines
- <https://www.overthedustymoon.com/>



Who's Who in Dust Mitigation

- We have setup a Who's Who in Dust Mitigation page on Confluence
 - Great opportunity stay on the radar of *all* of NASA and the rest of the community
 - Please contact Andrea Harman (ams573@alumni.psu.edu) to get set up with an account!
1. Sign-in to add your and your organization's information
 2. Click the "Edit" button in the upper right-hand corner to add your details to the table
 3. You can add your information before, during, or after today's meeting



Dashboard / Dust Mitigation Home

Who's Who In Dust Mitigation

Created by Andrea Harman, last modified by Jorge Nunez on Jun 17, 2021

Make sure that you stay on the radar of *all* of NASA and the rest of the community! Fill out the table below for your institution: don't be shy! Please don't delete other entries. **Add new entries to the bottom.**

Other Focus Groups:

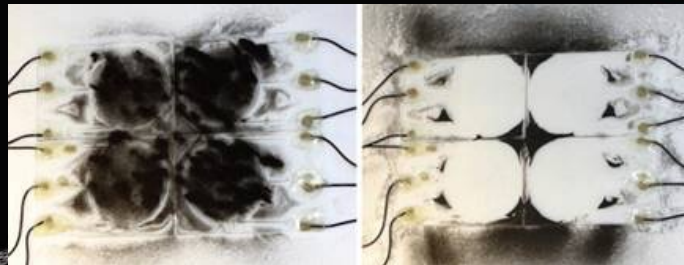
- Who's Who in EA
- Who's Who in EE
- Who's Who in E&C
- Who's Who in ISRU
- Who's Who in SP

Click the "Edit" button in the upper right-hand corner to add your details to the table below. Once in "edit" mode, click on the table and then you can add rows using the tool bar at the top:

Who Are You? (Individual or Institution)	What Do You Do?	What You Want Others To Know About You?	Other Comments	Website, Contact Info, PoC
Example: MoonCheese, Inc.	Example: Prospect for and mine Münster, Gouda, and other soft cheeses from mid-latitude Procellarum-KREEP terrain	Example: Happy to license Cheese Detection and Ranging (CheDAR) technology to NASA and commercial partners	Example: Working with STMD; looking to engage with SMD and Wisconsin dairy farmers	Example: MoonCheese.space; info@MoonCheese.space
Dr. Jorge Núñez, LSIC-DM FG Facilitator	As the LSIC Facilitator for Dust Mitigation, I help facilitate conversations and collaborations among NASA, industry, academia, non-profits and government in areas relevant to Dust Mitigation.	As both a scientist and engineer, my research interests focus on characterizing the composition of planetary surfaces from the micro- to macroscale and developing instrumentation for future missions. I am also a team member on the Mars 2020, New Horizons, and Dragonfly missions.	I'm here to help build this community. Our goal is to build bridges not just between between you and NASA but also between community members. If you are looking for opportunities to be more active in this community, let me know!	http://lsic.jhuapl.edu/Focus-Areas/Dust-Mitigation.php Facilitator_DustMitigation@jhuapl.edu jorge.nunez@jhuapl.edu
Maxar	Maxar builds spacecraft, subsystems (e.g., power, thermal, comms), and robotics	Maxar has a 60+ year history of building spacecraft, spacecraft subsystems, and space robotics for government and commercial customers. Highlights include: supporting Artemis with the Gateway's PPE, and with power, comms, and thermal subsystems for the Dynetics Human Landing System; the Psyche spacecraft bus; nearly all the (dust tolerant) robotic arms	Happy to partner with anyone looking for lunar surface robotics systems, or any other space-qualified systems (e.g., power, thermal, comms).	https://www.maxar.com/ Doug Hemingway (douglas.hemingway@maxar.com)

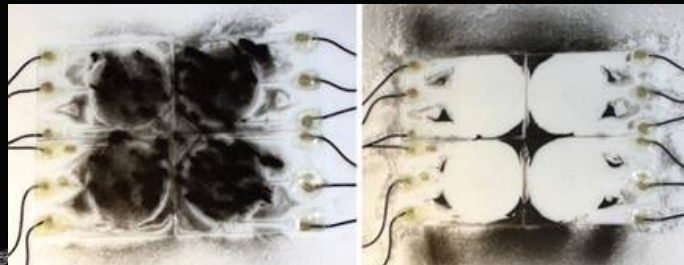
Dust Mitigation FG Subgroups

- **Materials and Surface Coatings:**
 - *Optical Systems* – Viewports, camera lenses, solar panels, space suit visors, mass spectrometers, other sensitive optical instruments
 - *Thermal Surfaces* – Thermal radiators, thermal painted surfaces, thermal connections
- **Seals, Soft Goods, and Fabrics:**
 - *Fabrics* – Space suit fabrics, soft wall habitats, mechanism covers
 - *Seals and Soft Goods* – Space suit interfaces, hatches, connectors, hoses
- **Mechanisms:**
 - *Mechanisms* – Linear actuators, bearings, rotary joints, hinges, quick disconnects, valves, linkages
- **Monitoring and Filtration:**
 - *Gaseous Filtration* – Atmosphere revitalization, ISRU processes
 - *Dust monitoring* – Cabin and external dust monitoring
- **Modeling:** – *Dust plume modeling*
- **Lunar Surface Modification** – Lunar landing pads, dust free zones and workspaces
- **Isolation Technologies** – Technologies that keep dust out



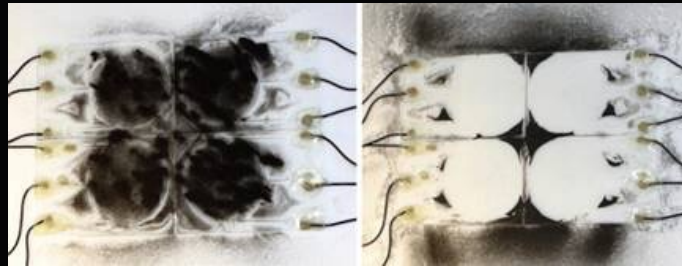
Dust Mitigation FG Subgroups

- Expected subgroup products are defined below:
- Capture Quad Chart: Single slide presented at the focus group monthly telecon. Signals the start of the task.
- Discussion Package: Short presentation that defines challenges associated with category based on the work of the subgroup. Guides one ~5 minute presentation at a focus group monthly tag-up with 10 min discussion (Fall 2021-Winter 2022).
- Confluence Wiki Catalogue: Overview of subgroup and resources - Ready by April 2022
- Archive Package: Revised version of the Discussion Package - Ready by April 2022



Dust Mitigation FG Subgroups

- Please fill out the short survey below if interested or would like to sign-up:
- <https://docs.google.com/forms/d/e/1FAIpQLScB6iT2fgPqj2zIaP0s-rwWQDQ04TPfgVyiC5zn0AQPAT5CZA/viewform>
- Anyone is welcome to join! Thank you to those who have already filled out the survey.

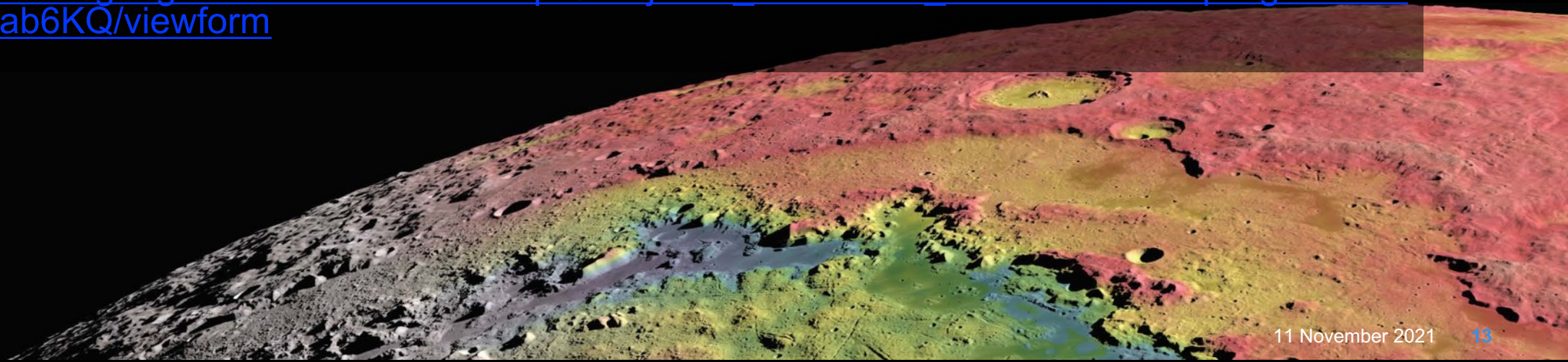


What is next for Dust Mitigation FG?

Help us improve the Dust Mitigation Focus Group!

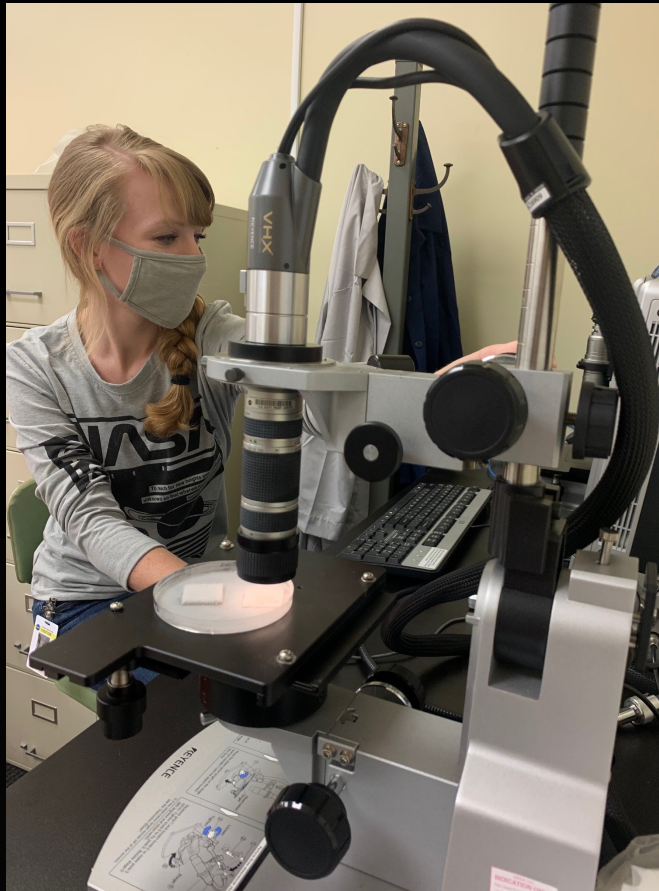
- What benefits have you gained from being part of the LSIC Dust Mitigation Focus group?
- Is there anything else you enjoy about monthly meetings? Anything you'd like to see us change?
- Is there anything you liked about this past year that you'd like to see continue?
- Is there anything about this past year that you'd change going forward?
- Are there other activities you would like to see us organize?

- Please fill out the feedback survey:
- https://docs.google.com/forms/d/e/1FAIpQLSdjuTIK_TLMnCM4_aSMLAzLS762qtzbgmcOd2fgizlCsab6KQ/viewform



Today's Presentation

“NASA-STD-1008: Dust Testing Standard Overview”



Dr. Kristen John

Lunar Dust Mitigation

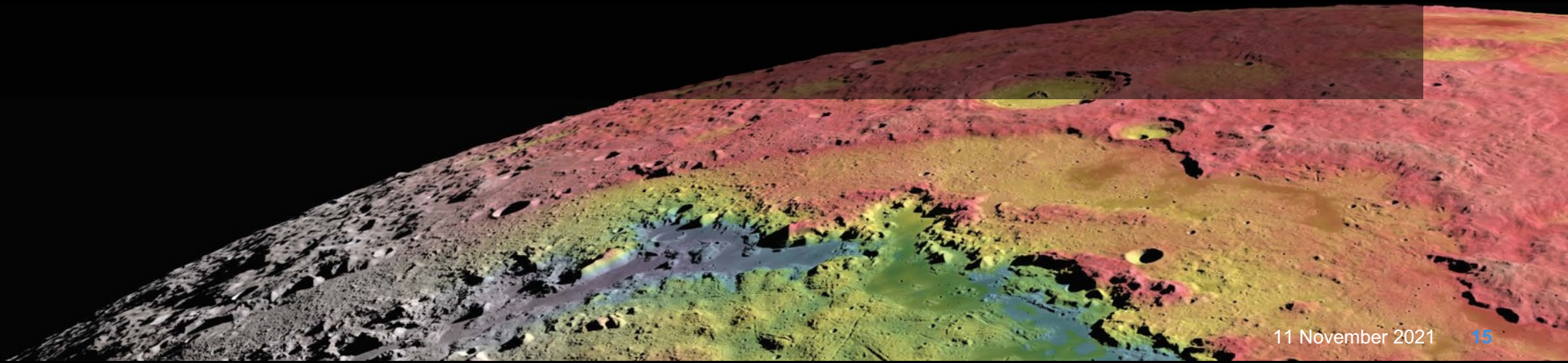
**EX2/Spacecraft Performance & Concept
Engineering (SPaCE)**

NASA Johnson Space Center

kristen.k.john@nasa.gov

NASA-STD-1008 Discussion

- Do you work with testing hardware under dusty conditions? If so, how do the testing requirements outlined in NASA-STD-1008 compare to your testing requirements?
- What are the best practices used by your organization?
- Are there items missing in NASA-STD-1008 that ought to be included or updated?





JOHNS HOPKINS
APPLIED PHYSICS LABORATORY