



Lunar Surface Innovation

C O N S O R T I U M

Extreme Access Focus Group Telecon

February 10, 2022

We'll start around 3:03-3:05

Dr. Angela Stickle
Senior Research Scientist
JHU Applied Physics Laboratory

Facilitator_ExtremeAccess@jhuapl.edu



JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

Today's Agenda

- New team members!
- LSIC Updates
- Upcoming Meetings/Opportunities
- MOSA Working Group
- Technology Spotlights
- Open floor and Discussion

10 February 2022

Created by Angela Stickle, last modified 7 minutes ago

Welcome to the February telecon for the Extreme Access Focus Group!

Add a comment below to sign in and discuss.

Please add yourself to the [Who's Who](#) if you haven't had a chance. Feel free to add any info about what you're hoping to get out of the LSIC network (collaborations, etc) in "other comments"

[Check out the LSIC Facilities Database!!](#)

Agenda:

LSIC Updates

[MOSA Working Group Discussion](#)

[Technology Spotlight: Alexandria Terry, National Geospatial Intelligence Agency, on the Lunar Reference](#)

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1 Comment



Angela Stickle

We look forward to speaking with you all today!

Reply Edit Delete Like 27 minutes ago

Confluence is an important resource to provide asynchronous discussion opportunities and a record of conversations



Write a comment...

<https://lsic-wiki.jhuapl.edu/x/o1lxAg>

1. Add a comment to sign in
2. Select an agenda topic and comment your thoughts
3. Follow-up after the telecon to continue to discussion!

Introduction: Charles Brothers

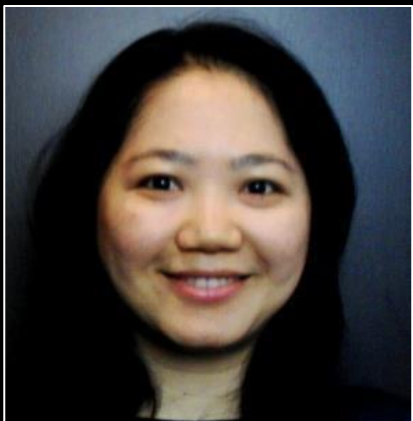


- APL scientist with a GNSS, orbital radar, and optical background
- 3 years at Malin Space Science Systems working with mission planning, data processing, and data public release
- PhD in Geoscience/Geophysics from the University of Texas at Austin
- San Diego native that is learning to live in Maryland (winter is cold!)

Introduction: Aparna v. Srinivasan ("Sri")



- **Former:** Licensed attorney, practiced with federal government for 10+ years
- **Expertise:** National Security Law (DoD), Litigation, Dispute Resolution, Administrative and Regulatory Law, Employment Law
- **Current:** Legal SME for projects/technical studies across the Lab, space systems analyst, tech-policy analyst



- Ph.D. in astrophysics from UMD
 - High-energy observations of merging galaxies
- NASA postdoctoral fellow at Goddard
 - Multiwavelength studies of black holes
- Research staff / assistant director at the Institute for Defense Analyses Science and Technology Divisions
 - Assessments of technologies and programs for the DoD
 - Development of end-to-end models and knowledge databases
- Research staff at APL starting December 2021
 - Space exploration sector
- In my spare time, I (try to) train cats...



Asteroid and (Comet) Tuttle being told to get off the desk.

LSIC Updates

Funding Opportunities

- NASA SBIR/STTR Phase I Solicitation
 - Proposals due March 9, 2022
 - <https://sbir.nasa.gov/solicitations>
- NSF SBIR/STTR Phase I Solicitation
 - Proposals due March 23 2022
 - <https://www.nsf.gov/pubs/2022/nsf22551/nsf22551.htm>
- Release of NASA Space Technology Mission Directorate - Early Career Faculty
 - Proposals must address one of the following topics:
 - Topic 1 – Development of Lightweight Solar Sail Attitude Control Technologies
 - Topic 2 – Hibernation and Recovery of Solar-Powered Systems for Lunar Missions
 - Topic 3 – Tailorable Composite Design Concepts towards Dimensionally Stable Structures
 - Notices of Intent Due: March 2, 2022
 - Proposals Due: March 31, 2022
 - <https://nspires.nasaprs.com/external/solicitations/summary.do?sollId={BF27BB84-C93F-9D37-4FFE-8790D23AD076}&path=&method=init>
- Please visit LSIC website for full list
 - <http://lsic.jhuapl.edu/Resources/Funding-Opportunities.php>

Space Technology Research Grants Program

Early Career Faculty

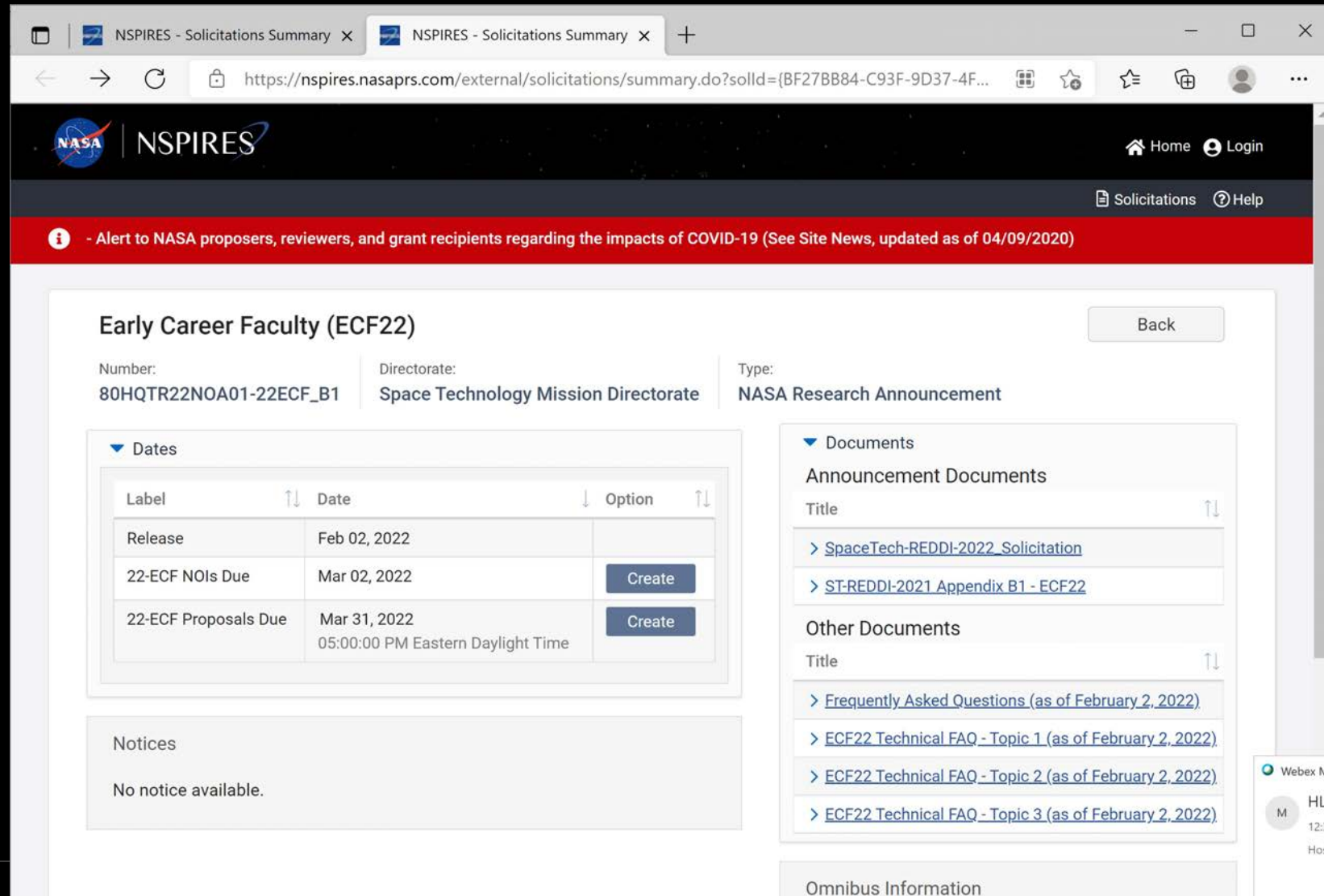
- **Goal:** ECF is focused on supporting outstanding faculty researchers early in their careers as they conduct space technology research of high priority to NASA's Mission Directorates
- **Eligibility:** Accredited U.S. universities are eligible to submit proposals on behalf of their outstanding new faculty members who intend to develop academic careers related to space technology.

Key Dates:

- Release Date: February 02, 2022 (DONE)
- **Notices of Intent Due: March 02, 2022**
- **Proposals Due: March 31, 2022**
- Selection Notification: August 05, 2022 (target)
- Award Start Date: October 01, 2022 (target)
- **Typical Technology Readiness Level (TRL):** TRL 1 or TRL 2 at the beginning of the effort.
 - **Award Duration: Maximum of three years**
 - **Typical Award Amount: \$200K/per year**

Space Technology Research Grants Program, ECF Page

<http://tinyurl.com/NASA-ECF22>



NSPIRES - Solicitations Summary x NSPIRES - Solicitations Summary x +

https://nspires.nasaprs.com/external/solicitations/summary.do?solId={BF27BB84-C93F-9D37-4F...

NASA NSPIRES Home Login Solicitations Help

- Alert to NASA proposers, reviewers, and grant recipients regarding the impacts of COVID-19 (See Site News, updated as of 04/09/2020)

Early Career Faculty (ECF22) Back

Number: 80HQTR22NOA01-22ECF_B1 Directorate: Space Technology Mission Directorate Type: NASA Research Announcement

Dates

Label	Date	Option
Release	Feb 02, 2022	
22-ECF NOIs Due	Mar 02, 2022	Create
22-ECF Proposals Due	Mar 31, 2022 05:00:00 PM Eastern Daylight Time	Create

Notices

No notice available.

Documents

Announcement Documents

Title

- [SpaceTech-REDDI-2022_Solicitation](#)
- [ST-REDDI-2021 Appendix B1 - ECF22](#)

Other Documents

Title

- [Frequently Asked Questions \(as of February 2, 2022\)](#)
- [ECF22 Technical FAQ - Topic 1 \(as of February 2, 2022\)](#)
- [ECF22 Technical FAQ - Topic 2 \(as of February 2, 2022\)](#)
- [ECF22 Technical FAQ - Topic 3 \(as of February 2, 2022\)](#)

Omnibus Information

Space Technology Research Grants Program

Questions regarding the solicitation including clarification of the technical topics are encouraged.

- We only get 2 pages to explain the topics in the solicitation.
- We really do want good proposals, So please ask for clarification.
- But use the proper channels (the email below)

- **Point of Contact: Claudia Meyer**
Space Technology Research Grants Program Executive
hq-ef-call@mail.nasa.gov

- **Reference the following:**
 - SpaceTech-REDDI-2022 Appendix B1- 22ECF
 - Topic 2

Regolith to Rebar: Joint ISRU – E&C Metal Workshop on Feb. 23, 2022

- One-day virtual workshop that looks into the supply and demand sides of in-situ derived metals derived from O₂-extraction and other technologies.
- Speakers from NASA leadership and industry on supply and demand sides. Panel discussion.
- Some issues to be addressed :
 - Discuss infrastructural needs for the use of metals.
 - Discuss feasibility of metal-specific manufacturing processes on lunar surface.
 - Develop concepts for how to integrate the two sides, including identifying possible roles for NASA.
 - Identify gaps and challenges in metal construction on lunar surface.
 - Discuss economic feasibility of metallic yields and any desired associated additional processing, including areas ripe for improvement.
- Registration required. For more information and registration go to <https://lsic.jhuapl.edu/Events/Agenda/index.php?id=177>

Over-arching goal is to develop a common and realistic mutual understanding of what is possible for metal ISRU in the near-term (next 5-10 years).



Upcoming Meetings

- Focus Group Telecons (2nd Thursday each month, 3-4 pm EST)
 - February 10, 2022
 - March 20, 2022 (This is during LPSC)
- Lunar Surface Science Workshop, February 17, 2022 (virtual)
 - Heliospheric Applications Enabling and Enabled by Human Exploration of the Lunar Surface
 - <https://www.hou.usra.edu/meetings/lunarsurface2020/>
 - Free, but registration is required
- *Regolith to Rebar Workshop*
 - Registration Deadline: February 15, 2022
 - Event Date: February 23, 2022 (virtual)
 - <https://lsic.jhuapl.edu/Events/Agenda/index.php?id=177>
- *53rd Lunar and Planetary Science Conference (hybrid)*
 - Registration Deadline: Mar 11, 2022
 - Event Date: March 7-11, 2022 in The Woodlands, Texas
 - <https://www.aeroconf.org/>



Upcoming Meetings

- **LSIC's Spring Meeting**

- Abstracts Due: March 4, 2022
- Event Date: May 4-5, 2022 (hybrid)
- <https://lsic.jhuapl.edu/Events/Agenda/index.php?id=200>

- ***2022 IEEE Aerospace Conference***

- Registration Deadline: February 27, 2022
- Event Date: March 5-12, 2022
- <https://www.aeroconf.org/>

- ***International Astronautical Congress 2022***

- September 18-22, Paris France
- Abstracts due: February 28, 2022
- <https://www.iafastro.org/events/iac/iac-2022/technical-programme/>



Upcoming Meetings

- AIAA ASCEND Conference
 - October 24-26, 2022 in Las Vegas, NV
 - Call for Content now open! Propose a session or submit an abstract
 - Deadline: March 31, 2022
 - <https://www.ascend.events/call-for-content/>

There will be a joint EE/EA workshop in late May or early June. Stay tuned for more information!

Subgroup Meetings

- PNT Subgroup meeting: February 17, 2022 (3pm ET)
- Comms: February 16, 2022 (1 pm PT/4 pm ET)
- Mobility: February 24, 2022
- TRN: stay tuned!
 - Discussion of hardware trades between MSL and Ingenuity TRN systems

Moonlight call for use cases

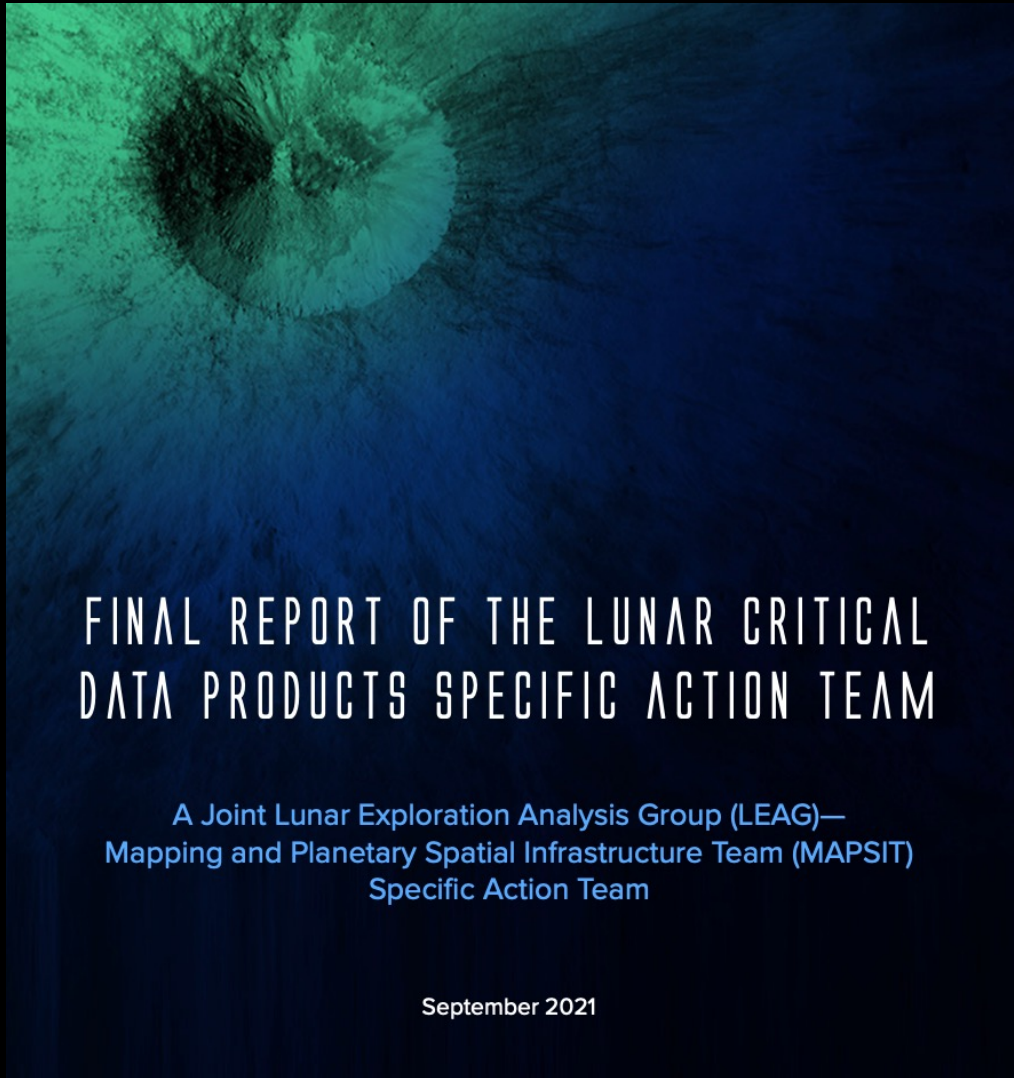
What would you do when Lunar Communications and Navigation Services (LCNS) will be available around the Moon?

- The Moonlight initiative (ESA is encouraging European space companies to put a constellation of telecommunications and navigation satellites around the Moon) put out a RFI
- Seeking ideas and use cases for the proposed Lunar Communications and Navigation Service



Submit your ideas before the 30th of April 2022

<https://ideas.esa.int/servlet/hype/IMT?documentTableId=45087661362955447&userAction=Browse&templateName=&documentId=335dbe1a8f262b8e3fbd02bcfb89de12>



- The Lunar Exploration Analysis Group (LEAG) and the Mapping and Planetary Spatial Infrastructure Team (MAPSIT) created a Special Action Team last summer
- Charge: Discuss current lunar data products, state of the art, and what will be needed to enable future exploration in the near- and far-terms
- The final report has been released!
- https://www.lpi.usra.edu/mapsit/reports/leag_mapsit_report_2022-01-11.pdf

OUTCOMES.....	8
Lunar Coordinate Systems and Frames	8
Critical New Foundational Data Products for the South Pole	11
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Realize a Lunar Spatial Data Infrastructure (SDI)	25

LSIC | MOSA Working Group

- **LSIC Modular Open System Approach (MOSA) Working Group**

- Goal:

- Document community feedback on recommended lunar MOSA activities
 - Compile existing efforts and identify overlap
 - List systems that could benefit from MOSA
 - Perform system decompositions to find critical interfaces & what requirements are needed to ensure interoperability

- Plan

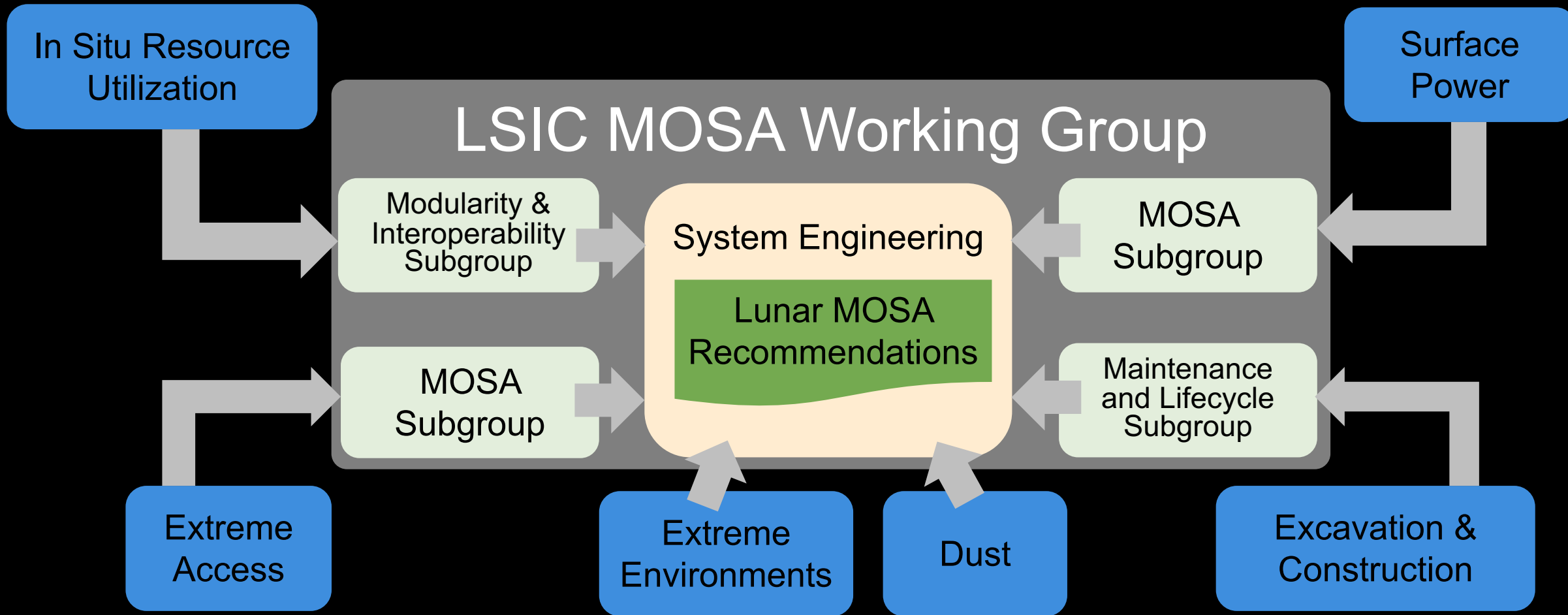
- Each LSIC focus group is participating and has a POC
- Cross focus group participation is encouraged

- Points of Contact

- Lead/Coordinator: James Mastandrea
- System Engineer: Kristin Jaburek
- Dust Mitigation: Jorge Núñez
- Excavation & Construction: Claudia Knez
- In Situ Resource Utilization : Jodi Berdis
- Surface Power: Samantha Andrade
- Extreme Environment: Jamie Porter
- Extreme Access: Angela Stickle



LSIC | MOSA Working Group





LSIC EA Annual Goal Reminder

- Identify mission/system elements needed to explore challenging lunar environments, including identifying specific technology needs and gaps, **prioritizing development timelines**, and providing a general roadmap and recommendations for needed technology, testing, and demonstrations.
 - *Permanently Shadowed Regions (PSR) and lunar pits/lava tubes were chosen as high priority environments*
 - *We will work with the EE group to identify environment requirements and challenges*
 - *Conduct at least one targeted Technical Interchange Meeting (TIM)*
- Build a community and develop collaborative relationships among members
 - Inclusive monthly telecons with member technology spotlights and invited technical talks
 - Provide networking opportunities at large LSIC meetings, mentoring through LSIC channels
 - Community-led subgroups for in depth discussions and networking



How?

- Identify areas and/or environments of interest (**We've done this**)
- Pick 1-2 (**We've done this**)
- Identify specific technology needed to enable exploration of these areas. What are the environments like? What are the needs for mobility, PNT, comms, autonomy?
- Evaluate current technology availability, compare to what is needed for (3). This will likely involve standing up several smaller subgroups.
- Identify gaps, prioritize which are more important to close first
- Roadmap, determine recommendations for specific tech development and/or demos
- Throughout: keep in mind where will need input or tech crossover from other focus groups. Where does technology development require multiple inputs?
- Write a report of some sort

↑
We are
here
↓



Looking Forward

- Subgroups are the easiest place for us to build community and to have more detailed conversations
 - Conversations over the past year have ranged in topic, but address themes related to the annual goal
 - We will be collecting feedback from the subgroups in the next few months
 - This feedback and recommendations will be provided to the community and to STMD
 - Feedback can be “white paper” style or more informal
- Joint EE/EA workshop will focus on deep PSRs

Subgroups submit feedback



February

March

April

May

June

Subgroup Discussions

Compiling
Feedback

LSIC Spring
Meeting

EE/EA
Workshop

Technology Spotlight

Alexandria Terry (National Geospatial Intelligence Agency)

The Lunar Reference System for Navigation Safety



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APPLIED PHYSICS LABORATORY

- Confluence is our record of discussions and a good repository
 - Confluence is free to you and available to all registered LSIC members
 - We will be using Confluence to document discussions and provide resources to LSIC members. All focus groups have a separate page so it's a good collaboration space.
 - To request an account, please email Andrea Harman: ams573@alumni.psu.edu
- Technology Spotlights/Lightning Talks at monthly telecons
 - Anyone can volunteer to give a lightning talk (10-20 mins)
 - Email Angela or Sarah, or comment on Confluence, to sign up!
- Updates to the webpage - <http://lsic.jhuapl.edu/Focus-Areas/Extreme-Access.php>
 - Notes, slides, recordings from telecons posted here

Follow the Code of Conduct for all Focus Group communications

Contact information

LSIC Director: Rachel Klima, SES-LSIC-Director@jhuapl.edu
<http://lsic.jhuapl.edu>

Focus Group Area	Listserv address	Facilitator
In-Situ Resource Utilization	LSIC_ISRU@listserv.jhuapl.edu	Karl Hibbitts
Surface Power	LSIC_Power@listserv.jhuapl.edu	Wes Fuhrman
Extreme Environments	LSIC_ExtremeEnvironment@listserv.jhuapl.edu	Jamie Porter
Extreme Access	LSIC_ExtremeAccess@listserv.jhuapl.edu	Angela Stickle
Excavation and Construction	LSIC_ExcavationConstruction@listserv.jhuapl.edu	Athonu Chatterjee
Dust Mitigation	LSIC_DustMitigation@listserv.jhuapl.edu	Jorge Núñez

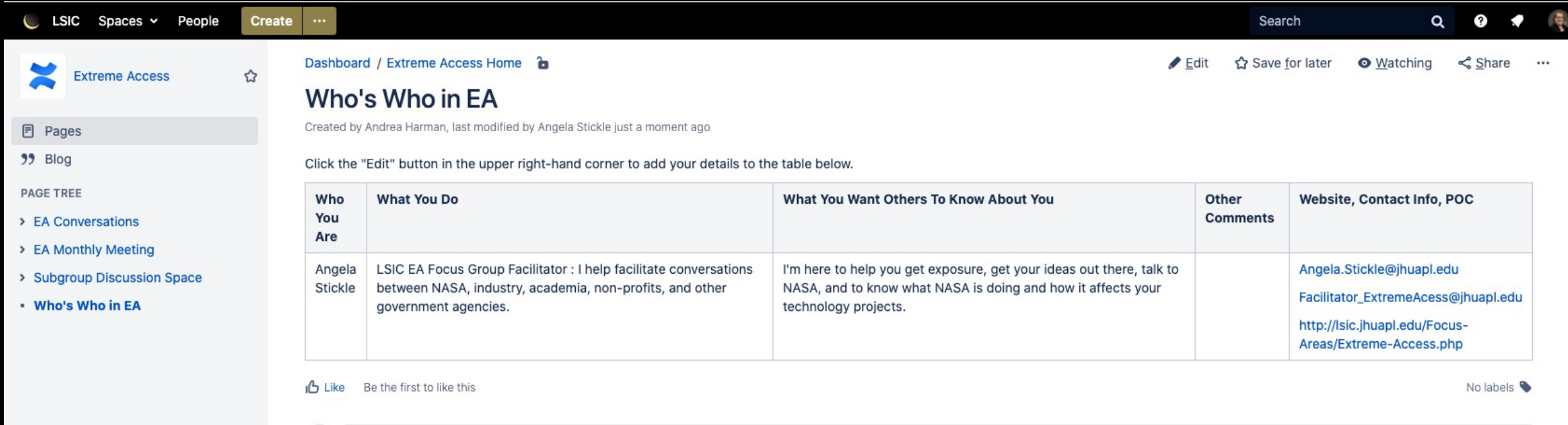


LSIC Meeting Cadence

- **Bi-Annual Meetings** (Spring and Fall)
- **Monthly Focus Group Meetings**
 - 2nd Tuesday of the Month 3:00-4:00 pm – Extreme Environment
 - 2nd Thursday of the Month 3:00-4:00 pm – Extreme Access
 - 3rd Wednesday of the Month 3:00-4:00 pm – ISRU
 - 3rd Thursday of the Month 12:00-1:00 pm – Dust Mitigation
 - 4th Thursday of the Month 11:00 am-12:00 pm – Surface Power
 - 4th Wednesday of the Month 2:00-3:00 – Excavation and Construction
- **Thematic Workshops** (as identified by FGs and NASA POCs)
 - Workshops In development Funding, CLPS Provider

Get to know the community

<https://lsic-wiki.jhuapl.edu/x/0IVf>



LSIC Spaces People Create ... Search

Extreme Access

Dashboard / Extreme Access Home

Who's Who in EA

Created by Andrea Harman, last modified by Angela Stickle just a moment ago

Click the "Edit" button in the upper right-hand corner to add your details to the table below.

Who You Are	What You Do	What You Want Others To Know About You	Other Comments	Website, Contact Info, POC
Angela Stickle	LSIC EA Focus Group Facilitator : I help facilitate conversations between NASA, industry, academia, non-profits, and other government agencies.	I'm here to help you get exposure, get your ideas out there, talk to NASA, and to know what NASA is doing and how it affects your technology projects.		Angela.Stickle@jhuapl.edu Facilitator_ExtremeAccess@jhuapl.edu http://lsic.jhuapl.edu/Focus-Areas/Extreme-Access.php

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Who's Who in ISRU: <https://lsic-wiki.jhuapl.edu/display/ISRU/Who%27s+Who+in+ISRU>

Who's Who in Surface Power: <https://lsic-wiki.jhuapl.edu/display/SP/Who%27s+Who+in+LSIC-Surface+Power>

Who's Who in E&C: <https://lsic-wiki.jhuapl.edu/pages/viewpage.action?pageId=6260179>

Who's Who in EE: <https://lsic-wiki.jhuapl.edu/display/EE/Who%27s+Who+in+LSIC-EE>