



# Lunar Surface Innovation

C O N S O R T I U M

## LSIC Excavation and Construction Focus Group

<http://lsic.jhuapl.edu/>

**December 4, 2020 (November Meeting)**

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# Friendly Reminders

- Slides, chat and recording will be posted in our website.  
(<http://lsic.jhuapl.edu/Focus-Areas/Excavation-and-Construction.php>)
- Feel free to post your questions/suggestions in ‘chat’.
  - We can move the discussion to Confluence.
- Please mute yourself if you are not speaking.



# Focus Group Update

- December meeting cancelled.
  - Falls on the 25<sup>th</sup> .
  
- Next monthly meeting on January 29<sup>th</sup>, 2021.
  - Emailing me is always an option.
  - Confluence.

# Focus Group Update

- Use *Confluence* for technical discussions, sharing resources, seeking feedback from the community,-----.
  - <http://lsic-wiki.jhuapl.edu/> (sign-up required)
  - Contact Andrea Herman for access: [ams573@alumni.psu.edu](mailto:ams573@alumni.psu.edu)
- LSIC Executive Committee: 15 Members (see December newsletter)

# Funding Opportunities

## ***Break the Ice Lunar Challenge***

Excavate icy regolith and deliver acquired resources in extreme lunar conditions.

- <https://breaktheicechallenge.com/>
- Information webinar session on Tuesday, December 8th, 4:30 PM Eastern.

## ***Other Opportunities***

- Dust Mitigation Technologies for Lunar Applications (<http://bigidea.nianet.org/2021-challenge/>)
- Watts on the Moon Centennial Challenge ([https://www.nasa.gov/directorates/spacetech/centennial\\_challenges/watts-on-the-moon/index.html](https://www.nasa.gov/directorates/spacetech/centennial_challenges/watts-on-the-moon/index.html))

# Agenda

- Prof. Clive Neal (University of Notre Dame) will present a preliminary report on the findings of the recently conducted ASCEND workshop, ***Sustainable Lunar Presence: Infrastructure to Stay***. (~10 minutes)
- Dr. Greg Baiden will share his knowledge and vision of ***Underground Construction and Mining: Terrestrial and Lunar Applications***. Dr. Baiden is the CTO of Penguin Autonomous Systems Inc., which is a company developing robotic solutions for mining and other industries. He is the author of the Canadian Space Agency strategic plan for Mining the Moon. (~30 minutes)



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<b>Habitat construction in lunar conditions. (Inflatable habitat, underground habitat, radiation shielding, multi-functional materials/structures)</b>	<b>70.5%</b>
Manufacturing processes for lunar construction. (Additive manufacturing, sintering, regolith fiber pulling)	63.6%
Excavation technology for hard regolith/icy material. (Drilling, mining, lightweight construction equipment)	61.4%
Autonomous vehicles and robots for E&C on lunar surface.	59.1%
Lunar surface structure development. (Landing pads, berms, roads)	54.5%
Increased autonomy of operations.	34.1%
Virtual lunar terrain simulation.	29.5%
Beyond additive technology.	22.7%
Long duration robust , easily maintainable robot design for industrial scale use (not science)	2.3%
Subsurface and interior imaging and composition analysis	2.3%
Compressed, sifted regolith as a building material	2.3%
Spacecraft refueling station development	2.3%



# LSII System Integrator - APL

*A key tenet of LSII is to implement a multitude of novel collaborations across industry, academia, and government in order to successfully develop the transformative capabilities for lunar surface exploration.*

## Origin of the APL Task

- NASA was investigating using a University Affiliated Research Center (UARC) to bring efficiencies to development
- LSII initiated a tasked APL, to assess system integration role for the Lunar Surface Innovation Initiative
- APL established a Lunar Surface Consortium with academia and industry representatives, as well as NASA experts, that span a broad range of capabilities to execute timely studies, tasks, and/or acquisitions

## The Consortium will assist NASA in

- Identifying lunar surface technology needs and assessing the readiness of relative systems and components
- Making recommendations for a cohesive, executable strategy for development and deployment of the technologies required for successful lunar surface exploration
- Providing a central resource for gathering information, analytical integration of lunar surface technology demonstration interfaces, and sharing of results

