



2023 Lunar GW Workshop

# Merging Lunar Exploration with Multi-Messenger Revolution

October 4-6 | Vanderbilt University | Nashville, TN

**Day 1—Wednesday, October 4, 2023**

**Morning Session: Overview of lunar exploration program, multi-messenger and decadal reports (Session Chair: Robert Reed)**

Time	Speaker	Topic/Title
9:00—9:30am	COFFEE RECEPTION / REGISTRATION	
9:30—10:00am	Karan Jani Director, Vanderbilt Lunar Labs Initiative; Chair, Scientific Organizing Committee	Welcome Remarks and the Laser Interferometer Lunar Antenna (LILA) Project
10:00—10:10am	Kip Thorne Feynman Professor Emeritus at Caltech; Nobel Laureate in Physics	Opening Remarks (virtual)
10:10—10:30am	Kelly Holley-Bockelmann Director, Fisk-Vanderbilt Bridge Program; Chair NASA APAC & NASA LISA Study Team	Multi-Messenger Astrophysics Landscape and ESA/NASA space mission LISA
10:30—11:00am	Krystyn Van Vliet Vice Provost for Research, Cornell; Co-Chair BPS Decadal Survey	Biological and Physical Sciences Decadal Survey (virtual)
11:00—11:20am	TEA BREAK	
11:20—11:30am	Krish Roy Dean of Engineering, Vanderbilt University	Remarks
11:30—12:00pm	Keivan Stassun Director, Frist Center for Autism & Innovation, Vanderbilt; Astro 2020 Decadal Committee	Astronomy and Astrophysics Decadal Survey
12:00—12:30pm	John Karcz Project Scientist, NASA Commercial Lunar Payload Services	Commercial Lunar Payload Services: Contracted deliveries of NASA payloads to the Moon
12:30—12:50pm	Sebastien Vincent-Bonnieu Discipline Lead for Physical Sciences, European Space Agency	Moon: Science and Exploration at ESA (virtual)

12:50—2:00pm	LUNCH (Provided at the venue)	
Afternoon Session: Overview of astrophysics from the Moon and gravitational-wave astronomy (Session Chair: Kelly Holley-Bockelmann, Vanderbilt)		
2:00—2:30pm	David Shoemaker MIT Kavli Institute & LIGO; Gravitational Wave International Committee	Present and Future Terrestrial Gravitational-Wave Detectors
2:30—3:00pm	Rita Sambruna Deputy Director of Astrophysics Science Division, NASA Goddard Flight Center	NASA multi-messenger astronomy Initiatives
3:00—3:30pm	Philippe Lognonné Institut de physique du globe de Paris (IPGP), Université Paris Cité	LILA Project - Lunar Geoscience meets Gravitational-wave Astronomy
3:30—4:00pm	Stuart D. Bale University of California Berkeley; PI of LuSEE mission	The Lunar Surface Electromagnetics Experiment (LuSEE)
TEA BREAK		
Evening Session: Open to A&S and Engineering Faculty (Session Chair: Kelly Holley-Bockelmann, Vanderbilt)		
4:30—4:50pm	Padma Raghavan Vanderbilt University Vice Provost for Research and Innovation	Remarks and VU Sesquicentennial Anniversary
4:50—5:20pm	Joel Kearns NASA Deputy Associate Administrator for Exploration	NASA's Lunar Exploration Program
5:20—6:30pm	Wine & Cheese Reception (Alumni Hall)	

## Day 2—Thursday, October 5, 2023

Morning Session: What is the unique science case for the LILA Project? (Session Chair: Philippe Lognonné, Université Paris Cité)		
Time	Speaker	Topic/Title
9:00—9:30am	COFFEE RECEPTION	
9:30—9:50am	Léon Vidal IPGP; Université Paris Cité	Preliminary sensitivity study for LILA detector
9:50—10:10am	Giacomo Fragione Northwestern University	Intermediate-mass black holes: past, present, future
10:10—10:30am	Sarah Schon Penn State	Sub-solar mass black holes with atomic dark matter

10:30—10:50am	Aaron Tohuvavohu Canadian Institute for Theoretical Astrophysics (CITA)	Watching Mergers Live!
10:50—11:10am	Kiranjyot (Jasmine) Gill Harvard University	Supernovae and GW memory science with LILA
11:10—11:30am	TEA BREAK, Group Photo	
11:30—12:00pm	Prakash Chauhan Director, National Institute of Remote Sensing, Indian Space Research Organization (ISRO)	Hydrated Moon: An Insight from Indian Lunar missions (virtual)
12:00—12:20pm	Josipa Majstorović IPGP; Université Paris Cité	Amplitude estimation of the Moon's spheroidal motion induced by a gravitational wave
12:20—12:40pm	Sébastien de Raucourt IPGP; Université Paris Cité	Lunar Optical VBB development status
12:40—2:00pm	LUNCH (Provided at the venue)	
Afternoon Session: What are the existing resources that can enable the LILA Project?—Part 1 (Session Chair: Karan Jani, Vanderbilt University)		
2:00—2:30pm	Volker Quetschke Associate Dean for Research & Graduate Programs, University of Texas Rio Grande Valley	Core Technologies to enable LIGO's sensitivity
2:30—2:50pm	Brian Sierawski Research Associate Professor of Electrical and Computer Engineering, Vanderbilt	Vanderbilt University Institute for Space and Defense Electronics (ISDE)
2:50—3:10pm	Trent Martin Vice President of Lunar Access, Intuitive Machines	Intuitive Machines: Enabling Commercial Lunar Scientific Exploration
3:10—3:30pm	Valerio Boschi Staff Researcher, European Gravitation Observatory (Virgo)	Seismic isolation on the Moon
3:30—3:50pm	Jake Matthews CEO, Zeno Power	Radioisotopes on the Moon
3:50—4:00pm	TEA BREAK	
4:00—4:30pm	Steve Squyres Chief Scientist, Blue Origin	Blue Moon Lander (virtual)
4:30—4:50pm	Gabor Karsai Executive Council, Institute for Software Integrated Systems, Vanderbilt	Vanderbilt University Institute for Software-Integrated Systems
4:50—5:10pm	James Trippe Institute for Space and Defense Electronics, Vanderbilt	Radiation Mitigation for LILA
6:00pm onward	Conference Banquet at LA Jackson (Invitation Only)	

Remarks by Julia Velkovska, Cornelius Vanderbilt Professor of Physics and Chair of Vanderbilt University's Department of Physics & Astronomy
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### Day 3—Friday, October 6, 2023

#### Morning Session: What are the existing resources that can enable the LILA Project?—Part 2 (Session Chair: Robert Reed, Vanderbilt University)

Time	Speaker	Topic/Title
9:00—9:30am	COFFEE RECEPTION	
9:30—10:00am	Karan Jani, Vanderbilt University	LILA White Paper
10:00—10:20am	Antonella Ferri Planetary Exploration Study Manager, Thales Alenia Space	Lunar exploration programs and activities in Thales Alenia Space—Italy (virtual)
10:20—10:40am	Jan Harms Professor, Gran Sasso Science Institute, INFN National Laboratories of Gran Sasso	Lunar Gravitational-Wave Antenna (LGWA) (virtual)
10:40—11:00am	Simone Dell'Agnello INFN	ESA's MoonLIGHT Pointing Actuator (MPAc) laser retroreflector (virtual)
11:00—11:30am	TEA BREAK	
11:30—12:00pm	Discussion on LILA sensitivity budget Moderator: Eleonora Capocasa, IPGP	

#### Afternoon Theme: Building an Inclusive Lunar Astrophysics Collaboration (Session Chair: Kelly Holley-Bockelmann, Vanderbilt)

12:00—12:10pm	Timothy P. McNamara Dean of Arts & Sciences, Vanderbilt	Remarks
12:10—12:40pm	Kelly Holley-Bockelmann Director, Fisk-Vanderbilt Bridge Program	Fisk-Vanderbilt Bridge Program and EMIT
1:00—2:00pm	Lunch Discussion (provided at venue), Moderator: Session Chair i) Building an inclusive, collaborative structure for the LILA project; ii) Interface of the Bridge Program with NASA's lunar exploration goals	
2:00—2:20pm	Stephen Taylor Vanderbilt University; Chair NANOGrav Collaboration	International Pulsar Timing Array Discovery of Gravitational Waves
2:20—3:00pm	Breakout Sessions for White Paper Discussions a) Science Team (led by Karan Jani)	

	b) Payloads Team (led by Philippe Lognonné, Stuart D. Bale, & Robert Reed)
3:00—3:20pm	Report from breakout session leads.
3:20—3:40pm	Open discussion on the next step of the LILA project (Moderator: Robert Reed)
3:40—4:00pm	2023 Lunar GW Workshop Concludes with Remarks by SOC