



Diverse Assets &
Applications
International
LABoratory
Classroom for
Advanced &
Frontier
Education

SERIES 103

Shreya Santra
2025-07-23

Series - 103

Date and Time - 23 July 2025 (Wednesday) (3:30 PM JST | 12:00 IST)

Venue - Zoom

Speaker - Dr. Shreya Santra

Affiliation - Graduate School of Engineering, Tohoku University, Sendai, Japan

[Current Affiliation - Specially-appointed Lecturer, Department of Aerospace Engineering, Tohoku University]

E-mail - shreya.santra@tohoku.ac.jp



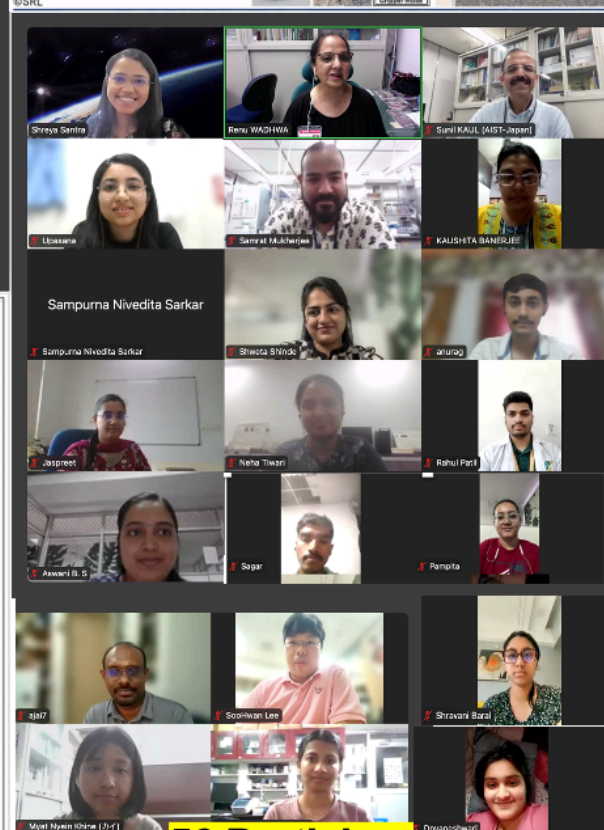
Advancing Robotic Systems to Explore and Sustain Life Beyond Earth

Recent technological progress is transforming the scope of human and robotic exploration, enabling sustained missions to the low-Earth orbit, Moon, Mars, and other deep-space targets. In these distant and extreme environments, robotic systems play a crucial role throughout the mission lifecycle—ranging from early reconnaissance and mapping to autonomous infrastructure deployment and long-duration operations. Their ability to function in environments that are physically inaccessible or hazardous for humans makes them essential for advancing science, enabling infrastructure, and reducing mission risk. At the Space Robotics Laboratory, Tohoku University, my research focuses on the development of intelligent, modular, and heterogeneous robotic systems tailored for planetary surface exploration, autonomous assembly tasks, and scalable operations. A core component of my work involves learning-based algorithms that allow robots to adapt their locomotion and manipulation strategies in response to real-time environmental inputs. I design multi-agent coordination frameworks capable of distributed sensing, cooperative planning, and task allocation, with particular emphasis on communication efficiency and fault-tolerant decision-making in bandwidth-constrained scenarios. Our ongoing work also includes building high-fidelity realistic simulation environments and hardware-in-the-loop testing pipelines to close the gap between software development and real-world deployment.








Additionally, I lead efforts to develop compact robotic platforms suited for conducting microgravity experiments. We have demonstrated these systems in planetary analogue sites, validating their robustness in mobility, cooperative operation, and terrain-adaptive deployment.

This work advances not only space exploration objectives but also contributes towards terrestrial use cases such as disaster response, mine surveying, and inspection in hazardous environments.

Limbed Robotics Research



56 Participants
Thanks Everyone !

M	Mangala	RW	Renu WADHWA (Host, me)
MN	Myat Nye		Shreya Santra
	Nabilah I	a	ajai7
N	Namrata	AM	Anamika Mishra
NR	Naufal R		Anjana@ IIT Guwahati
NT	Neha Tiv	a	anurag
N	Nirmitee	A	Anushka
PJ	Pallavi Jc	AG	ANUSHKA GARHWAL
P	Pampita	A	Ashveedha Jayasinghe
P	Parama	AB	Aswani B. S
	Pratik Su	A	Atharva
PS	Priyanka	A	Avinash
RS	Riya Saw	AK	Ayush Kinekar
S	SAMIRAI	BN	Bharathwaj N
SN	Sampurr	B	Bhoomi Agarwal
SM	Samrat k	D	Dhritiraj
s	shravan	D	Dnyaneshwari
S	Shrawan		KAUSHITA BANERJEE
	Soohwai	K	Khushabu
S	Sosmitha	K	Kumud patil
SK	Sunil KAI	LT	Lenovo TB128XU
U	Upasana		M MUKESH KUMAR
HV	HARIN	V	Vedant