

Ritsumeikan University, Graduate School of Frontier Exploration in Earth and Space

[This graduate school is currently in the planning stage. The name is provisional, and details of the plan are subject to change.]



Space drives humanity forward.

To extend human life beyond Earth, we deliver advanced technologies and knowledge to the frontiers of space and Earth.



Anything one man can imagine, other men can make real.

This is a famous quote attributed to 19th century French novelist Jules Gabriel Verne, known as the father of science fiction and visionary author who wrote many works, including *From the Earth to the Moon* and *Twenty Thousand Leagues Under the Seas*.

Humans have explored deep space and landed on the Moon,
—these feats were once imagined and were later turned into realities.

From now, what comes next?

What will be imagined and who will accomplish it?

Today, space exploration is entering a new era.

After decades of studying and exploring the Moon and Mars,
humanity is now aiming to use space resources and establish a sustainable presence beyond Earth.

The space industry is rapidly evolving.

Meanwhile, the world needs more capable people.

To take on the challenge of space frontier exploration, we must take a multi-disciplinary approach.

Science to deepen our understanding of the planets, geology, and minerals;

engineering to develop space probes and observation equipment;

and management to drive forward international space projects.

Ritsumeikan University's Graduate School of Frontier Exploration in Earth and Space is designed to cultivate highly competent people who can propel space studies as a practical project, with a cross-disciplinary approach bridging science, engineering and management.

To understand space is to better understand Earth.

To explore Earth is to shape our future in space.

By translating new insight into technological innovation,
we are embarking on a new journey to extend the human frontiers.

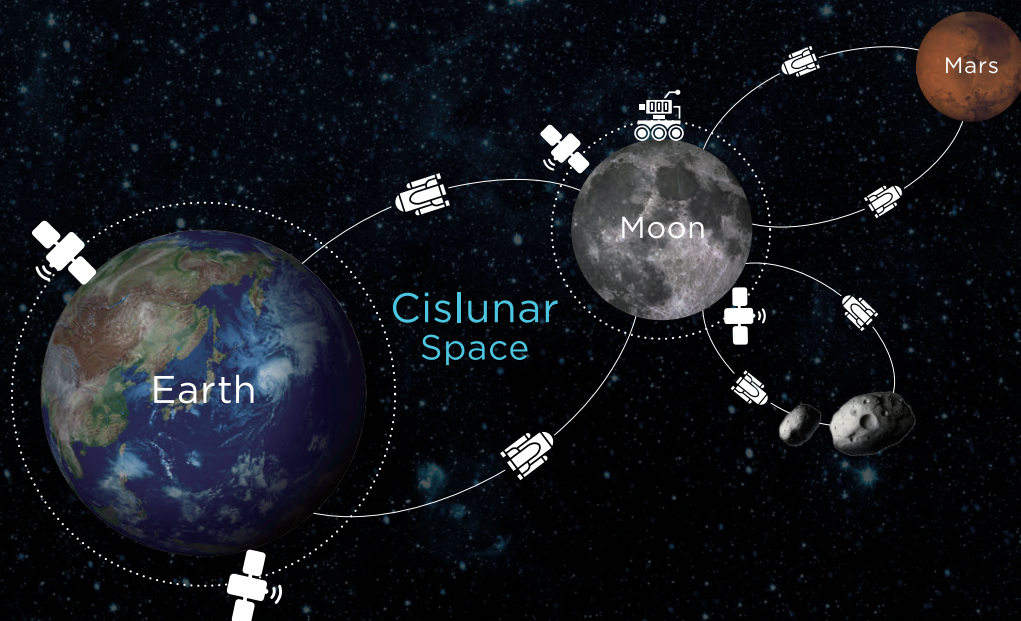
MISSION

A New Graduate School Spanning Space and Earth

The Graduate School of Frontier Exploration in Earth and Space conducts research and education focused on the Moon, Mars, cislunar space, and Earth. In the space domain, key areas include space science, exploration, satellites, and space utilization, while on Earth the focus is on Earth sciences, the environment, extreme regions, and new resources and energy. Through interdisciplinary learning, we advance research and education covering mission planning, development of spacecraft and observation instruments, and data utilization, while contributing to solving social issues—such as environment, disaster prevention, resources, energy, and infrastructure—through the application of space technologies.

In collaboration with Ritsumeikan's Earth & Space Exploration Center (ESEC), we establish a practical research and education environment enabling activities from scientific analysis to equipment development and space-environment testing on campus. We also offer an international English-based learning environment and cultivate practical skills through project-based education and research.

As space development shifts from “discovery” to “utilization,” with growing private-sector participation and commercialization, graduates will work not only in established fields such as satellite development but also in emerging areas such as lunar resource utilization, rover development, and propellant. Moreover, we take on diverse roles in managing space development projects, advancing international collaboration and pioneering new space businesses.



Prospective Faculty

As of 2026, faculty members who are leading international frontier exploration and development projects, as well as those involved in the global field of micro-satellites, are scheduled to join the Graduate School of Frontier Exploration in Earth and Space.

About 20 faculty members will join the Graduate School.

Faculty
Share the
Excitement
of Space
Research!



Shinichi NAKASUKA

April 2026~: Professor, Research Organization of Science and Technology, Ritsumeikan University; Special Aide to the President.
April 2028~: Scheduled to assume the position of Dean of the Graduate School of Frontier Exploration in Earth and Space



Kazuto SAIKI

Professor, Research Organization of Science and Technology, Ritsumeikan University
Director, Earth & Space Exploration Center (ESEC)



Taizo KOBAYASHI

Professor, College of Science and Engineering,
Ritsumeikan University
Deputy Director, Earth & Space Exploration Center (ESEC)



Yusuke NAKAUCHI

Associate Professor, Research Organization of Science and Technology, Ritsumeikan University
Member, Earth & Space Exploration Center (ESEC)



Hiroshi NAGAOKA

Associate Professor, Research Organization of Science and Technology, Ritsumeikan University
Member, Earth & Space Exploration Center (ESEC)

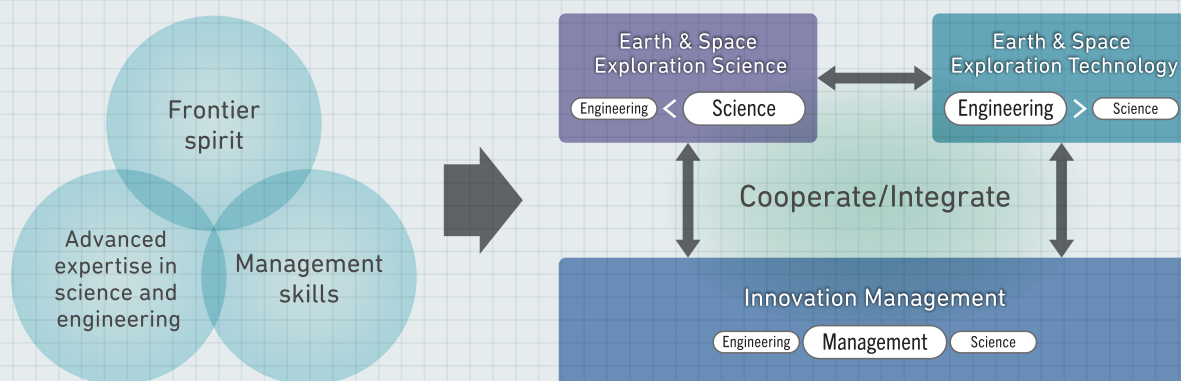
FEATURES

Features of Learning

FEATURES

01 A Cross-disciplinary Graduate School Combining Science, Engineering, and Management

In addition to planetary and Earth sciences (science) and spacecraft development and space utilization (engineering), the program is designed to integrate project management and entrepreneurship, and it will also include courses on topics such as data science and space law. Rather than offering education based on highly specialized fields within the natural sciences and engineering, the graduate school will adopt a cross-disciplinary curriculum that spans science, engineering, and management.



FEATURES

02 A Broad Scope of Focal Fields (Moon / Mars / Cislunar Space / Earth)

As we transition from the current era of space exploration and research (Phase 1) to an era of space utilization (exploration and development of the Moon and Mars and data utilization—Phase 2), as exemplified by the Artemis program, the graduate school will take the lead in conducting education and research centered on Phase 2, with a long-term vision extending to the future Phase 3 (the establishment of human habitats in space). The scope of focal fields is broad, encompassing everything from Earth to Mars, and will cover a wide range of activities, from understanding scientific frontier environments (including lunar and Martian satellites and planetary environments) to developing engineering-based exploration and utilization equipment, and utilizing the interdisciplinary data obtained from these frontier environments.



Ritsumeikan's Definition
of Space Exploration and
Development Phases



FEATURES

03 Close Collaboration with the Ritsumeikan University Earth & Space Exploration Center

The Graduate School of Frontier Exploration in Earth and Space will be established as an educational unit that forms an integral part of ESEC, and it will leverage ESEC's cutting-edge research findings, facilities and equipment, and expertise in human resources development in its educational programs. ESEC is working to advance space technology development with a particular focus on lunar and planetary exploration, under the government's Space Strategy Fund, a national project supporting technological development in the space sector by companies and universities. In Phase 1, ESEC was selected for the "SX Research and Development Site" project (Principal Investigator: ESEC Director Saiki), and in Phase 2, two projects on the topic of "Elemental Technologies for Lunar Infrastructure Development" were also selected (Principal Investigator: Deputy Director Kobayashi; Co-Investigator: Associate Professor Nagaoka).

ESEC also signed a cooperative agreement with the Japan Aerospace Exploration Agency (JAXA) on the development of a crewed pressurized lunar rover, and Toyota Motor Corporation is participating as one of JAXA's partner companies in this project. We are collaborating with industry to conduct cutting-edge research aimed at the research and development of crewed pressurized rovers for NASA's Artemis program as well as the study and promotion of lunar exploration.



Ritsumeikan University;
Earth & Space
Exploration Center (ESEC)

FEATURES

04 One-Stop Experimental Environments Simulating the Moon and Mars

Ritsumeikan's unique testing environment consists of a suite of devices and test fields designed to replicate the dusty environment found on the Moon and Mars, which is characterized by soil and sand known as regolith. These include a dust testing chamber, regolith analyzer, and lunar surface simulation field site. The "Next-Generation Planetary Development Lab" concept, which incorporates a space environment cleanroom, is rare in Japan outside of JAXA's Institute of Space and Astronautical Science, and it will serve to cultivate talent in a research environment tailored to space development.



Conceptual image of a dust testing chamber



Conceptual image of a chemical analysis lab for regolith analysis



Lunar surface simulation field site (Nippon Yakin Kogyo Co., Ltd.)
The rover was developed as part of the Ministry of Land, Infrastructure, Transport and Tourism's "Space Construction Innovation Project."

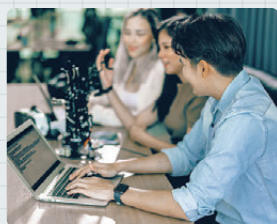


Conceptual image of a cleanroom

FEATURES

05 Project-Based Learning (PBL)

The curriculum will be built around hands-on, project-based learning to develop practical implementation skills and the ability to integrate knowledge across disciplines. With this approach, we aim to clearly differentiate this program from lecture-centered curricula.



FEATURES

06 Data-Driven Learning

In addition to hardware development, we also place emphasis on the utilization and monetization of satellite and exploration data. Through data analysis, modeling, and forecasting, our students will acquire the data-driven decision-making skills that will contribute to future mission planning and lead to the creation of new value.



FEATURES

07 A Learning Environment Designed for International Projects Involving International Students

With a policy of accepting international students to make up approximately half of the student body, we will build an educational and research framework based on multicultural collaboration. Through project activities, we will cultivate practical English skills and the ability to work effectively in global teams.



FEATURES

08 Business Creation that Anticipates Entrepreneurship and Commercialization

Entrepreneurship and intrapreneurship will be embedded in the curriculum, and pathways for commercialization originating within the university, such as the real-world application of research findings, will be presented. In addition, we will collaborate with the Ritsumeikan Office of Startup Promotion and the Ritsumeikan Social Impact Fund (RSIF). While also promoting collaboration with companies and other partners, we aim to develop human resources who can hit the ground running in the industry.



Ritsumeikan Impact Makers Inter X Platform (RIMIX)



FEATURES

09 Broad-based Practical Applications

Technologies developed through space activities will be spun off to contribute to solving issues on Earth in fields such as disaster prevention, resources, infrastructure, the environment, and energy. Rather than being limited to the space sector, we will open up potential career pathways to a wide range of industries.



From Space to the Real World — A Broad Range of Career Possibilities

Learning about space does not mean you can only work in the space industry. By adopting perspectives that move between space and Earth and that span the fields of science, engineering, and management, the graduate school will cultivate the ability to succeed across fields and industries.

Space	Spacecraft manufacturers, space startups, space transportation businesses, satellite manufacturers, space exploration companies, satellite data utilization services, and more
Energy and resources	Resource development companies, plant engineering companies, electricity and gas utilities, renewable energy businesses, and more
Construction and infrastructure	General contractors, specialized construction firms, civil engineering and infrastructure companies, construction consulting firms, and more
IT and telecommunications	System development companies, telecommunications providers, cloud service companies, and more
Trading and consulting	General trading companies, specialized trading firms, management consulting firms, finance and investment businesses, and more
Research and education	Universities, public research institutions, private think tanks, education and learning support services, and more

VOICE Expectation for the Graduate School

Our Graduate School is highly valued by many companies. We invite you to visit our website to learn what they have to say about us.



AXELSPACE

[Axelspace Corporation]

Talent with a comprehensive and multifaceted understanding of the essence of the space business is highly attractive.

i s p a c e

[ispace]

Rise to the challenge! Don't miss this golden opportunity to experience the maturation of lunar development in real time.

TAKENAKA

[Takenaka Corporation]

We expect the interdisciplinary approach spanning science, engineering, and management to cultivate talent equipped with both expertise and flexibility.

Sanyo Chemical

[Sanyo Chemical Industries, Ltd.]

There is a clear need for talent capable of building the foundation for the new challenge of establishing human habitats in space.

KOHOKU

[Kohoku Kogyo Co., Ltd.]

We expect graduates with broad, deep, and practical education in the space field to take the lead on projects.

JGC JGC CORPORATION

[JGC CORPORATION]

We look forward to graduates who have acquired the skills needed to drive projects forward through practical education.

Outline

Tentative name	Graduate School of Frontier Exploration in Earth and Space (currently under development)	Enrollment capacity	Master's program: 100 students Doctoral program: 15 - 20 students
Date of establishment	April 2028 Fall Admission Available	Language of instruction	English-based (English/Japanese hybrid)
Location (Campus)	Biwako-Kusatsu Campus (Kusatsu City, Shiga)	Other features	International students are expected to account for approximately half of enrollment. Students will be able to earn their degrees entirely in English.

[Contact]

Office of General Planning and Development, The Ritsumeikan Trust

1 Nishinokyo-Suzaku-cho, Nakagyo-ku, Kyoto 604-8520 JAPAN MAIL : frex@st.ritsumeai.ac.jp

Published: October 2026

***This graduate school is currently in the planning stage. The name is provisional, and details of the plan are subject to change.**

Ritsumeikan University
Graduate School of
Frontier Exploration in
Earth and Space
Website

<https://en.ritsumeai.ac.jp/frex/>

