

# FY2015 Inter-University Exchange Project The University of Tokyo

Support for the Formation of Collaborative Programs with Latin America and the Caribbean, Turkey

## 【Name of project】 (Adopted year: FY2015, Country (Central and South America))

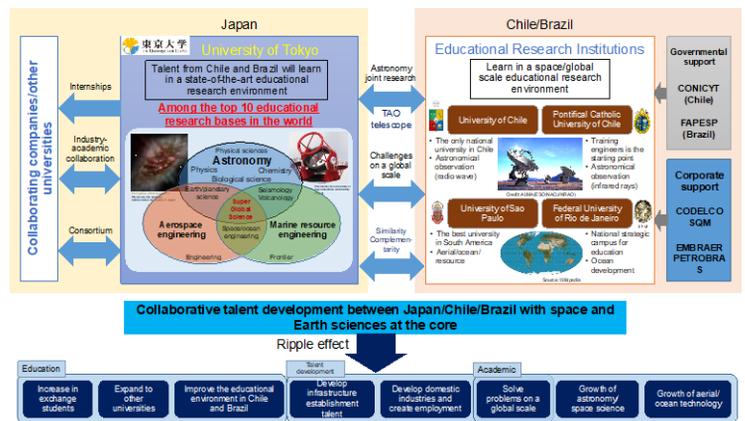
Fostering of students and researchers in science and engineering through Japan-Chile-Brazil collaboration

## 【Summary of project】

The South American continent is blessed with diversity in its natural environment with a variety of geographical environments and climates including high mountains, volcanoes, deserts, tropical rainforests, as well as characteristic ecosystems which they create. The world is paying attention to this region as a place where further international research activities can be promoted in natural sciences including astronomy, geology, and biology. There is also an ample amount of underground and marine resources which the world is looking forward to developing under international cooperation. Collaborating with this region, which has a high potential to develop talent who in the future will become leaders of the next generation in the fields of natural sciences and resource development from an international perspective, is extremely important.

The University of Tokyo has already been promoting research exchanges through joint research and academic forums between the School of Science and the University of Chile/Pontifical Catholic University of Chile (Republic of Chile), as well as between the School of Engineering/Graduate School of Frontier Sciences and the University of Sao Paulo/Federal University of Rio de Janeiro (Federative Republic of Brazil).

This project will expand the field of exchange even further, enrich the inter-university exchanges utilizing the rich natural environment and resources of the South American continent based on collaboration with Chile and Brazil, develop young talent, and establish a model for research and talent exchange between Japan and the South American countries.



## 【Summary of exchange program】

The undergraduate and graduate students from the universities in Chile and Brazil will be accepted into the University of Tokyo, and in exchange, the science and technology students from the University of Tokyo will be sent to the four exchange partner universities. Under a tight system of collaboration, internships with related companies will also be utilized in order to develop young talent. The specifics are as follows:

<Challenging program into the uncharted territories of natural sciences>

Mutual student exchange program in the field of astronomy/space science, as well as related earth and planetary science/biology/chemistry/physics, utilizing the world's largest and highest-performance telescope, the TAO infrared telescope, which is being built in the Atacama Desert of the Republic of Chile, a site perfectly suited for astronomical observation, as well as the ASTE submillimeter telescope, etc.

<Development program of aerial exploration techniques>

Student exchange and hands-on internship under the framework of international industry-academic collaboration based on aerial/satellite technology.

<Development program of rich ocean floor resources>

Education through remote lectures and internships with resource development companies through collaboration with Brazil, which has a high technological capacity for ocean floor resource development as demonstrated by the progress made in the development of untouched oil fields under the bedded-salt deep under the ocean floor.

## 【Global human resource on the project】

Develop talent with internationality, a comprehensive perspective, and deep knowledge of the natural sciences, who understand the importance of sustainability of the natural environment and Earth's resources, and who are able to realize, from an international perspective, technological development and resource exploration that are in balance with the environment.

## 【Feature on the project】

The program is designed to effectively instill in participants the ability to take an active role on the global stage by supporting the exchange of science and technology students within the state-of-the-art technology fields of the universities in Chile and Brazil, which have a record of academic exchanges, in the fields of research and development for which our university is at a top level, such as astronomical observations in Atacama desert, thermal hydraulic engineering research, micro satellite development, marine energy technology, and deep sea exploration technology.

	2015								2016								2017							
	A	Bo	Br	Ch	Co	M	Pa	Pe	A	Bo	Br	Ch	Co	M	Pa	Pe	A	Bo	Br	Ch	Co	M	Pa	Pe
Outbound			8	8							6	5							5	6				
Inbound											5	6							6	5				
	2018								2019															
	A	Bo	Br	Ch	Co	M	Pa	Pe	A	Bo	Br	Ch	Co	M	Pa	Pe								
Outbound			5	6							6	5												
Inbound			6	5							5	6												

A: Argentina Bo: Bolivia Br: Brazil Ch: Chile Co: Colombia M: Mexico Pa: Panama Pe: Peru

# 1. FY2015 Progress

【Name of project】(Adopted year: FY2015 Country ( Latin America ))

Fostering of students and researchers in science and engineering through Japan-Chile-Brazil collaboration

## ■ Exchange Programs

The purpose of the present program is to foster students and young researchers who have international insights and are active on the frontier of science and technology through world-class collaborative research with staff and scientists in Brazilian and Chilean universities. In FY2015, we carried out concrete planning to promote this program with the universities in Brazil and Chile and conducted mutual exchanges of students and researchers.

### Establishment of the executive board

In October 2015, we launched the Brazil-Chile-Japan faculty board in which the contents and future plans of the program are discussed and decided. We reinforced a collaborative relationship between the universities by mutual visits between the universities in Latin America and Japan (see Figure 1).



(Figure 1. A meeting with an academic exchange officer at the National Commission for Scientific and Technological Research in Chile (CONYCIT) and committee members of the SEELA board at the University of Tokyo)

## Student-Mobility

### ○ Outbound

From January to March 2016, nine students from the School of Science, the University of Tokyo visited the Atacama Plateau in northern Chile for an academic exchange of about 3 weeks (Figure 2). In February to March 2016, three students from the School of Engineering, the University of Tokyo stayed in Brazil to visit a laboratory at the University of Sao Paulo, to have a meeting at the space agency, and to attend a lab tour at an aircraft maker (Figure 3).

### ○ Inbound

Two students from the University of Chile visited the University of Tokyo and stayed for 3 months (January-March 2016) and 3 weeks (February 2016) for academic research and a short internship at a company.

<Latin America>

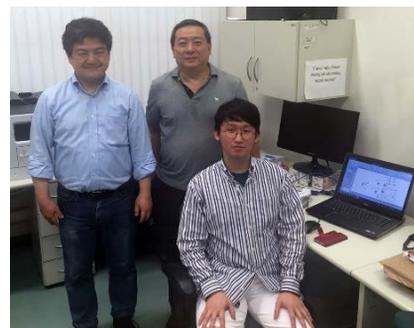


(Figure 2. Students from the School of Science, the University of Tokyo visiting the world's largest telescope built in the Atacama Plateau, 5,000 m above sea level, Chile)

	H27															
	Plan								Results							
	A	Bo	Br	Ch	Co	M	Pa	Pe	A	Bo	Br	Ch	Co	M	Pa	Pe
Outbound			8	8							3	9				
Inbound												2				

## ■ Forming the University Network with Quality Assurance

We have sent staff at the University of Tokyo to the universities and institutes in Brazil and Chile to assess the research and living environments in Brazil and Chile and to make sure the exchange program is conducted safely and efficiently. During the visits, we have shared with the Brazilian/Chilean universities the concept and future prospects of the program and the idea for scholarship support of students. Furthermore, faculty staff from the universities in Brazil and the University of Tokyo visited each other to establish the framework and content of remote lectures between the two countries, making it possible to initiate remote lectures from April 2016. Finally, we conducted a survey of students who participated in this program, and based on their honest opinions, we will improve the content and linguistic support of this program in FY2016.



(Figure 3. A student and a supervisor from the School of Engineering, the University of Tokyo visiting the University of Sao Paulo, Brazil)

## ■ Promotion of Student-Mobility Environment

We have employed Project Academic Support Staff and an officer who speaks Spanish and Portuguese, respectively. We have also established how we take care of inbound/outbound students prior to, during and after their stays in Japan or abroad.

## ■ Internationalization of the university

### Information disclosure and Publication of outcome

We have almost completed a website and pamphlet to share the contents of the program. To make this program more familiar to students and teachers in Brazil, Chile and Japan, we came up with an abbreviation for the program (SEELA, Science and Engineering Exchange Program with Latin America) and have created a logo (Figure 4).

## ■ Notices

- The elaborate preparation for the remote lectures in FY2015 has allowed us to initiate remote lectures with multiple universities in Brazil and Japan since April 2016.
- We have started to prepare an international kickoff symposium (SEELA Symposium 2016) which will be held in Tokyo in June 2016.
- We have started preparations for a Chile-Japan Academic Forum which will be held in Patagonia, Chile, in November 2016.



(Figure 4. The SEELA logo)

# 2. FY2016 Progress

【Name of project】(Adopted year: FY2015 Country ( Latin America ))

Fostering of students and researchers in science and engineering through Japan-Chile-Brazil collaboration

## Exchange Programs

In FY2016, new programs such as remote lectures, internships, and special intensive courses were developed, and student exchanges based on the exchange program were implemented. In the remote lectures which connect a total of nine universities in Japan and Brazil online, students could learn about country-specific advanced technologies, as well as experience the other country's conditions, culture, and way of thinking. It resulted in furthering the mutual understanding and internationalization of students.

(Total enrollment: 182 students; our university: 25 students; 4 Brazilian universities: 99 students)



〈Opening Ceremony of the Chile-Japan Academic Forum 2016〉

As a multidisciplinary international forum, the Chile-Japan Academic Forum 2016 was held in the region of Patagonia, Chile. Bringing together 12 research activities are based in Latin America, this forum was implemented with the full effort of all staff and students as well as the participation of the presidents of three universities in Chile, our Executive Vice President, the Ambassador of Japan to Chile, and the Governor of Magallanes. (Total number of participants: approximately 250; students of our university: 11; faculty members from our university: approximately 55)

## Student-Mobility

### Outbound



**Chile:** For the Chile-Japan Academic Forum 2016, eight students traveled to Chile to present their own research.

**Brazil:** Four students from the field of ocean engineering participated in the project-based learning in which Japanese and Brazilian students were divided into teams to compete. In addition, a mechanical engineering student studied at the University of Sao Paulo and participated in the Latin American IAA CubeSat Workshop, which was held locally during the stay.

〈← A dispatched student in the University of Sao Paulo 〉

### Inbound



**Chile:** A student was enrolled in a bioengineering research lab to work on a project study for two months.

**Brazil:** Three students participated in a training collaboration between Japanese and Brazilian students at the National Maritime Research Institute. A student was accepted for an internship in a shipbuilding company for approximately two weeks. A mechanical engineering student attended training at one of our university's research labs for a month. Two students came to Japan to participate in the Kickoff Symposium.

〈←An accepted student in a bioengineering research lab at our university〉

<Latin America>	2016															
	Plan								Results							
	A	Bo	Br	Ch	Co	M	Pa	Pe	A	Bo	Br	Ch	Co	M	Pa	Pe
Outbound			10	5							5	8				
Inbound			8	6							7	1				

## Forming the University Network with Quality Assurance

The collaborative faculty committee sets up regular meetings to exchange opinions and share information, as well as to attempt to improve the content with reference to the student questionnaires. In addition, in collaboration with other programs, 10 students visited the University of Sao Paulo, the Federal University of Rio de Janeiro, and local companies to have discussions and attempt to expand the network. The framework of the exchange program was extended by the addition of three Brazilian universities, namely the University of Campinas, the Federal University of Pernambuco, and the Federal University of Santa Catarina, as partner universities within FY2016.

## Promotion of Student-Mobility Environment

A special office for this project was established, and faculty members who are proficient in the languages were appointed, resulting in the establishment of the multilingual system. For the dispatched students, opportunities to take safety classes and language training are provided before dispatch. For the accepted students, graduate students of our university serve as TA. In this way, smooth progress of the exchange program is facilitated.

## Internationalization of the university

### Information disclosure and Publication of outcome

A website has been prepared for this project to introduce the exchange program and the content of the activities. To disseminate this project to the exchange universities, Spanish and Portuguese editions are also published. The project brochure is distributed in digital and paper editions.



〈Project Brochure /Japanese and English〉



〈Project-based learning at the Federal University of Pernambuco〉

## Notices

- The Chile-Japan Academic Forum 2016 was held in the region of Patagonia, Chile.
- The Kickoff Symposium of Brazil-Chile-Japan Science and Engineering Exchange Programs was held at our university.
- Faculty members of our university provided the special intensive courses at the University of Sao Paulo.
- Remote lectures were started by connecting a total of nine universities in Japan and Brazil online.
- Internships for Japanese and Brazilian students were conducted at the National Maritime Research Institute, Oshima Shipbuilding Co., Ltd., and the Federal University of Pernambuco.

### 3. FY2017 Progress

【Name of project】(Adopted year: FY2015 Country (Latin America))

#### Fostering of students and researchers in science and engineering through Japan-Chile-Brazil collaboration

##### ■ Exchange Programs

Commemorating the 120th anniversary of the signing of the Japan-Chile Treaty of Amity in FY2017, an event featuring the University of Tokyo, the Embassy of Japan in Chile, the Ministry of Foreign Affairs of Chile, the University of Chile, and the Pontifical Catholic University of Chile, opened in Chile with a memorial lecture by Takaaki Kajita, Director of the Institute for Cosmic Ray Research at the University of Tokyo and a Nobel Prize laureate in Physics 2015. Faculty and students of the exchange universities were invited to the lecture where they were provided a great opportunity to engage in a number of robust interactive exchanges.



〈At the memorial lecture in Chile〉

Approximately 200 Brazilian and Japanese students participated in the remote online lectures this fiscal year, which started last fiscal year among nine universities in Brazil and Japan. Among them, 20 students from the University of Tokyo received credit.

##### Student-Mobility

##### ○ Outbound

**Chile:** Three students received credit through conducting field surveys on earthquakes and tsunamis and interviewing local residents. A biological science student participated in a mini-workshop in the southern Patagonia region, an engineering student conducted training on medical imaging.

**Brazil:** Four ocean engineering students participated in internships, and a mechanical engineering student, who was attached to the Research Center for Gas Innovation, University of São Paulo, conducted research on molecular dynamics simulation.

##### ○ Inbound

**Chile:** Four students were attached to the research laboratory for seismic surveys. Two of them conducted field work in Tohoku. Among electrical engineering students, a student conducted an experiment on digital calibration in the astronomy research facility. As a result of receiving guidance in the aeronautics and astronautics research laboratory, two students succeeded in an experiment to send transmissions to the University of Tokyo's satellite, and brought back satellite communication equipment to Chile.

**Brazil:** A mechanical engineering student attached to a research laboratory conducted research on multiphase flow simulation, four ocean engineering students participated in internships at the National Maritime Research Institute and Shipbuilding Company, and a student received experimental education at the University of Tokyo.



〈Students in training dispatched to shipyards in Brazil〉



〈Aeronautics and astronautics students and Chilean students〉

<Latin America>	2017															
	Plan								Results							
	A	Bo	Br	Ch	Co	M	Pa	Pe	A	Bo	Br	Ch	Co	M	Pa	Pe
Outbound			6	7							5	5				
Inbound			7	7							6	7				

##### ■ Forming the University Network with Quality Assurance

The collaborative faculty committee attempts to improve collaboration with programs and program content through holding regular meetings to share opinions and information on student exchange. In addition, questionnaire surveys are given to students who take part in the program upon the completion of training, and their responses are discussed in order to improve exchange program content with the goal of creating better quality student exchanges.

##### ■ Promotion of Student-Mobility Environment

Staff proficient in the necessary languages are employed continuously to ensure that the dispatch and acceptance support system for student exchanges remain stable and functions efficiently.

**Dispatch:** Faculty members and researchers who are proficient in the local languages accompanied them, as required, in order to conduct the training in consideration of the students' safety. For the students who traveled alone to Chile, the language classes were provided in advance. For the case of the dispatch to Brazil, a safety seminar was provided to introduce students to the dangerous cases in the field and cultural differences.

**Acceptance:** The information was provided before coming to Japan by sending a life guidebook written in Spanish and Portuguese, including Japanese language learning.



〈Spanish class〉

##### ■ Internationalization of the university, Information disclosure and Publication of outcome

**Multilingualization of the website:** Published in Japanese, Spanish, and Portuguese.

**Revision of the brochure:** The latest program activities were added to the original content to make wide use of the information provision and dissemination of this program (Japanese and English/ paper edition and digital edition).

**Mini-lecture & Science café:** At the University of Tokyo's open campus, students who had been dispatched to Chile or Brazil in the past and accepted from Brazil gave a mini-lecture and science café. They introduced the exchanges with Latin America through science and their own research to the attendees.

##### ■ Notices

**Remote lectures:** There was a report that the mutual understanding and internationality of students were enhanced by having experiences the conditions, cultures, and thoughts of exchange countries.

**Internships:** Brazilian and Japanese students collaboratively conducted internships and worked together attempting to communicate amongst themselves. In addition, the exchange among the students was furthered by the fact that the Japanese students supported the accepted students during their stay.

**Holding of a forum:** In September 2018, a cross-disciplinary academic forum of the whole university including humanities and liberal arts courses is planned to be held in Nikko together with the universities of Chile and Brazil. This is envisaged to further activate the program and promote the international education collaboration.



〈Brazilian and Japanese students in the science café〉

## 4. FY2018 Progress

【The University of Tokyo】

### 【Fostering of students and researchers in science and engineering through Japan-Chile-Brazil collaboration】 (Adopted year: FY2015 Country (Latin America))

#### ■ Exchange Programs

The **Chile-Japan Academic Forum 2018 (Japan-Latin America Academic Conference 2018)** was held in Nikko, Tochigi Prefecture. In this forum, greetings were made by the Ambassador of the Embassy of Chile, the Cultural Counsellor of Embassy of Mexico, the Head of Science and Technology Section of the Embassy of Brazil, the Rector of the University of Chile, the Rector of the Pontifical Catholic University of Chile, the Provost of the University of Sao Paulo, the Rector of El Colegio de Mexico, the Vice-rector of the University of Magallanes (Chile), the Vice President and Executive Director of the University of Tsukuba, and other attendees. Universities with a focus on natural sciences, aerospace engineering and ocean engineering in Chile and Brazil, joined by a university in Mexico, participated in **10 research workshops, extending to the field of humanities and social sciences**. Subsequently, **talks were also held between Dr. Gonokami, President of the University of Tokyo and the Rectors and Vice Rectors of other universities**.



〈Accepted students from Chile who participated in the forum〉

**Total number of participants: approximately 250 persons** (Chile: 90, Brazil: 7, Mexico: 16, Japan/others: 140)

In the **remote online lecture** connecting nine universities in Japan and Brazil, **218 students in Japan and Brazil participated**.

Among them, **26 students from the University of Tokyo received credit**.

#### Student-Mobility

##### ○ Outbound

**Chile:** A Student from the Department of Aeronautics and Astronautics visited labs of two Universities of Chile, and discussed the joint research of micro satellites.

**Brazil:** A student from the Department of Ocean Technology, Policy, and Environment participated in an internship. In Project-based learning, a student teamed up with local students on issues and conducted group-based discussions, experiments and presentations.

← Dispatched student and his professor in Chile



##### ○ Inbound

**Chile:** Four seismology students participated in the Forum and the academic presentations and seminars in the laboratory. A biochemistry student stayed in a bioengineering research lab and received experimental education. Two electrical engineering students learned about various techniques and operation methods for micro satellites at the aeronautics and astronautics laboratory.

**Brazil:** A mechanical engineering student participated in an internship of approximately three weeks at Oshima Shipbuilding Co., Ltd. in Nagasaki Prefecture. Two mechanical engineering students learned about the use of ocean space at the Ocean Resource and Energy laboratory for approximately half a year.

〈Shipyard staffs and accepted student →〉



<Latin America>	2018															
	Plan								Results							
	A	Bo	Br	Ch	Co	M	Pa	Pe	A	Bo	Br	Ch	Co	M	Pa	Pe
Outbound			6	7							1	3				
Inbound			7	7							5	7				

#### ■ Forming the University Network with Quality Assurance

In March, we invited three faculty members from Brazil and held a meeting to review and discuss about internship training and remote online lectures. **Students from each field, together with faculty members from the Mechanical Engineering and Ocean Engineering of the University of Tokyo, discussed future project plans that will start from next fiscal year.**

#### ■ Promotion of Student-Mobility Environment

Our support structure for students works in a very stable manner, continuing to employ a language-proficient staff.

**The Japan Student Services Organization (JASSO)** provides scholarships to eligible students who meet the criteria.

Outbound: Students are given **a seminar on security and safety** before going to Brazil.

Inbound: Students are given **a living guidebook in Spanish and Portuguese** including a guide with some simple Japanese phrases.

#### ■ Internationalization of the university, Information disclosure and Publication of outcome

we distributed a brochure describing the outline of our activities to the Forum's participants, disseminating our activities to various people in many fields. The contents of activities of this project are published in **Japanese, Portuguese and Spanish** on the web page.



〈Opening Ceremony of the Forum〉

#### ■ Notices

Holding the Chile-Japan Academic Forum 2018: We continually discussed and entered into **an agreement between School of Science of the University of Tokyo and other Chilean university** in January 2019.

A preparation meeting was held to implement the fourth forum in Chile.

Remote online classes between Japan and Brazil: **The number of participants increased by about 60** from last fiscal year.

# 5. FY2019 Progress

## 【Fostering of students and researchers in science and engineering through Japan-Chile-Brazil collaboration】

(Adopted year: FY2015 Country (Latin America))

### ■ Exchange Programs

The **SEELA Symposium 2019 Overall Summary** was held at Koshiba Hall of the School of Science, the University of Tokyo. At the plenary session, the first secretary of the Embassy of the Republic of Chile in Japan, the manager of the Education Sector of the Embassy of the Federative Republic of Brazil in Japan and Sawako Shirahase, the Executive Vice President of the University of Tokyo made opening addresses, and Hiroyuki Takeda, the Dean of the School of Science, the University of Tokyo introduced interactions and achievements of the project to date. Then Professor Kazuo Nishimoto, the University of Sao Paulo, Professor Marcos Diaz, the University of Chile and Professor Takaaki Kajita, the Director of the Institute for Cosmic Ray Research, the University of Tokyo delivered lectures. Students and researchers from Chile and Brazil as well as those from the University of Tokyo attended the lectures, and at the questions and answers session, they actively exchanged opinions.



〈 Lecture by Professor Kajita 〉

### Student-Mobility



#### ○ Outbound

**Chile:** Two students specializing in the field of earthquakes participated in a workshop on slow earthquakes and conducted field research. One student majoring in physics made a presentation at a seminar.

**Brazil:** Five students from the School of Engineering and the School of Science participated in PBL (Project-based learning). Among them, three students received credit.

〈 ←PBL participants in Brazil 〉

#### ○ Inbound

**Chile:** Two students majoring in earthquakes and one student majoring in physics participated in workshops and seminars at laboratories at the University of Tokyo. The laboratory of bioengineering of the School of Engineering accepted one student, while the laboratory of aeronautics and astronautics received three.

**Brazil:** Oshima Shipbuilding Co., Ltd. offered an internship to one student. Four students were trained at the National Maritime Research Institute or the laboratory of Ocean Resource and Energy of the University of Tokyo.

〈 Accepted student from the University of Chile → 〉



<Latin America>	2019															
	Plan								Results							
	A	Bo	Br	Ch	Co	M	Pa	Pe	A	Bo	Br	Ch	Co	M	Pa	Pe
Outbound			8	5							5	3				
Inbound			8	6							5	7				

### ■ Forming the University Network with Quality Assurance

▶ SEELA symposium 2019 overall summary: Parallel Workshop Workshops on particle physics, cosmology, space engineering, marine engineering and energy engineering were held at the University of Tokyo, and researchers and students invited from Chile and Brazil made presentations on their own study or internship.

▶ Remote online lecture connecting nine universities in Japan and Brazil 141 students in Japan and Brazil participated. Among them, 15 students from the University of Tokyo received credit.



〈 Presentation by a student at a workshop on particle physics 〉

### ■ Promotion of Student-Mobility Environment

A support system by dedicated staff, which has been maintained from the start of the project, functioned stably, and the program was carried out through communicating with contact persons at the partner universities with safety of the students in mind. The students who experienced two-way interactions have established a relationship of mutual support at the country they stayed in. For the foreign students, local students from the University of Tokyo worked as tutors to support experiments and provided advice on life in Japan. The Japan Student Service Organization (JASSO) provided scholarship to eligible students who met the criteria.

### ■ Internationalization of the university, Information disclosure and Publication of outcome

▶ The achievements of remote lectures by nine universities of Brazil and Japan were introduced at the international conference 「ONLINE LEARNING 2019」 held in October 2019.

▶ The project brochure is distributed, and the contents of activities of this project are published in Japanese, Spanish and Portuguese on the web page.

### ■ Notices

▶ The remote lectures at the nine universities of Brazil and Japan newly obtained a budget to continue in four subjects in and after fiscal 2020.

▶ A former student from Brazil who participated in the project has taken up employment at the company where he undertook an internship.

▶ A joint research by Brazilian petroleum company Petrobras, the University of Sao Paulo and the Department of Mechanical Engineering, the University of Tokyo is scheduled.

▶ Three dissertations on tsunamis jointly written by the Earthquake Research Institute of the University of Tokyo and the Pontifical Catholic University of Chile were published.