JAXA Aerospace Project Research Associate recruitment 2013

No.	Research fields	Details of topics	Qualification	Academic research environment	Research leader	General inquiries	Research: Project contribution
1	Research of new instrumentations for next-generation X-ray and gamma-ray observations	Research of new instrumentations for next-generation X-ray and gamma-ray observations and their related technologies. In our division, inovative new technologies for X-ray/gamma-ray observations for the next international observatories and small satellites are being studied; X-ray focusing mirror systems, high-resolution X-ray spectrometers, X-ray pixel detectors, Compton hard X-ray detectors, and related technologies such as space cryogenics and digital data processing. Other researche themes based on applicant's own new ideas are also welcome.	Research experience in physics and astrophysics, in particular, in experimental physics and/or any instrumentations in astronomy and astrophysics.	Applicant can select various research themes in high-energy astrophysics instrumentations, since there are six supervisors with different research interests. Researchers can use various equipments of our group, e.g. X-ray beam facility, X-ray generators, cryogenic refrigerators, X-ray mirror replication facility, photo-lithography and micro-machining facilities.	Prof. K.Mitsuda, Prof. T.Takahashi, Prof. T.Dotani, Prof. M.Ishida, Asoc..Prof. N.Y.Yamasaki, and Asoc.Porf. M.Kokubun +81-50-3362-3621	Prof. K.Mitsuda +81-50-3362-3621	5 : 5
2	Researches in/for space radio astronomy	Both of (1) researches in space radio astronomy including space VLBIs and (2) conceptual examinations or technical developments for a future space mission of radio astronomy are supposed to be conducted.	* Understanding of basics of radio telescopes, interferometry, and VLBIs. * Experiments of radio observational studies for galaxy, active galactic nuclei, or Galactic objects. * Basic understanding of cenceptual examinations and technical developments, etc., for the space mission.	1) Collaboration with radio astronomy groups of ISAS/JAXA and Mizusawa VLBI Observatory of NAOJ. 2) (negotiable) Observation time of the Usuda 64-m antenna and Usuda 10-m antenna. 3) Development tools; cryostats and measuring instrument at mm-wave.	Prof. TSUBOI, Masato, Associate Prof. MURATA, Yasuhiro +81-50-3362-2956 +81-50-3362-2956	Associate Prof. MURATA, Yasuhiro +81-50-3362-2956	7 : 3
3	Solar physics researches based on Hinode observations	ISAS/JAXA is leading solar physics researches with the Hinode satellite. Hinode was developed and launched on September 2006 by ISAS, with NAOJ as domestic partner and with international partners. Applicants are expected to make major contributions to Hinode's scientific opeations and to perform data analysis for leading researches on solar physics and its related field. Hinode has three advanced telescopes, providing high spatial resolution data of magnetic and velocity field at the photosphere and diagnostics of the hot plasma in the corona. Depending on the applicants' interests, the research topics can be selected from various kinds of topics, including the heating of the corona and chromosphere, cornal dynamics, solar flares, genration, development, and dissipation of solar magnetic fields, Sun-heliosphere connection, and Sun-laboratory plasma comparisons. In addition to science researches with Hinode, applicants are encouraged to participate in conceptual studies and research developments for the future solar physics missions, such as Solar-C.	Research experiences on solar physics or its relevant research field are required for applicants. Applicants are expected to promote his/her researches (either observationally or theoritically) based on observations including Hinode. Researches should make contributions to further improvements on our knowledge on the Sun.	Reseaches can be promoted in deep collaboration with researchers in ISAS and NAOJ. Also, applicants can promote resarch works with foreign residents at ISAS. The computers at ISAS allow researchers to access all the Hinode data on line. Applicants are highly encouraged to participant in scientific operations of Hinode. With such opportunities, he/she can realise new observations with Hinode.	Associate Professor Taro Sakao, Associate Professor Toshifumi Shimizu +81-50-3362-3718 +81-50-3362-4663	Associate Professor Toshifumi Shimizu +81-50-3362-4663	5 : 5
4	Development of new methods for science data analysys/instrument design with high-performance computing technology	Numerical simulations can virtually reproduce the space environment that is quite diffucult to simulation in ground experiments, so that, they are expected to contribute design process of spacecraft system. Mission data obtained from the advanced science spacecrafts become huge volume, and complicated data process is required. Moreover, modern space science research styles require not only complex data analysis itself, but also cooperation with numerical modelings. Now that, high performance computing technology should be applied to wider situations of space science missions, not only to theoretical numerical simulations. In this sense, we will develop the applied technique of numerical simulations to science data analysis or spacecraft subsystem design.	The project researchers of this application is expected to propose new ideas for science data analysis technique or onboard subsystem design utilizing high-performance computing technology.	The project researchers will do their research topics under the collaboration with JAXA staffs related to their thema. The JAXA supercomputer system can be utilized for this research application.	Associate Prof. Iku Shinohara, Associate Prof. Ryoji Takagi +81-50-3362-3279	Associate Prof. Iku Shinohara +81-50-3362-3279	7 : 3
5	Higher animal research on hibernation mechanisms and biological effects of space environment	Biological effects of space environment on living organisms and hibernation mechanism shall be investigated by physiochemical metods for long-term stay in space. Higher animals, especially rodents, will be used as biological samples. In addition, muscle atrophy and functional degeneration also asses using noniversive imaging. Analyses of the samples from space experiments, which will be obtained by biospecimen sharing project with foreign space agencies like NASA, will be conducted. And ground-based basic researches shall be carried out to propose a newly conducted space experiment.	It is necessary to have experience of higher animal research with physiochemical and/or peripheral methods. It's better to have a background of a rodent research. It's also desirable to have a daily conversation skill in English.	Professor will give direct research with 1 researcher and 2 outside collaborators. The laboratory is so well equipped with various devices for nucleic acid or protein analyses, including HPLC and UPLC. It is available to use laser ionization time-of -flight mass spectrometry, laser confocal microscope, and cell culture facility. It is necessory to participate JAXA life science projects in cooperation with them, and to conduct your own research activities.	Professor, Noriaki Ishioka, Ph.D +81-50-3362-6072	Derector, Tetsuya Yoshida, Ph.D +81-50-3362-7824	7 : 3
6	Deep Space Mission Desgin	Unlike earth-orbiting satellites, deep space explorers must reach their target objects by themselves. Trajectory desgin is the first step of deep space mission planning, which strongly constrains schedule and scale of the mission and provides critical conditions for the spacecraft design. Accordingly, trajectory design of deep space mission is not a simple energy optimization process, but a high level synthesis process of spacecraft design, operation plan, and program management. For this reason, it is also frequently called "mission design."Therefore, a researcher is expected to join the study team on future deep space missions and to cope with the problems on mission analysis and spacecraft design. The researcher is also expected to study on the design process specific to deep space missions.	What is required to perform this research is a wide range of knowledge and capability in space technology. In particular, to have research experience in the field of astrodynamics (mainly of trajectory design), or research/development experience of spacecraft system is preferable.	The research is done under the lead of research staffs in ISAS Department of Space Systems and Astronautics, as well as the colaboration with other research staffs in JAXA (ISAS, JSPEC, etc.). A PC for design and analysis use will be provided to the researcher, and the JAXA super computer is also available on research necessity.	Associate Professor : Yasuhiro Kawakatsu +81-50-3362-7836	Associate Professor : Yasuhiro Kawakatsu +81-50-3362-7836	5 : 5
7	Technology demonstration test research of hybrid rocket engine	Basic researches of technology for hybrid rocket engines to improve engine performances are carried out. Improvement of regression rate, improvement of combustion efficiency, development of numerical computation code for turbulent boundary layer combustion, and so on are achieved. Now, It is time to step up to demonstrate the hybrid rocket technology. Project researchers of this application are expected to design and demonstrate the hybrid rocket engine of thrust level of 5 kN and improve the hybrid rocket technology such as swirling oxidizer flow or regenerative cooling nozzle for vaporizing liquid oxygen. The outputs of these researches are useful for more actual hybrid rocket engine in the future.	Knowledge of industrial dynamics, heat transfer engineering, fluid dynamics, industrial chemistry at the level of a bachelor's degree In addition, if possible, fundamental knowledge of electrical engineering, electronics, or numerical computation. experience of research in more than one of the fields above at the level of a master of engineering.	Research activities such as the numerical computation and the combustion tests supported and advised by professors which study hybrid rocket engines. Test equipments in Akiruno facility can be used for the combusiton tests. Conducting the combustion tests is supported by technicians in Akiruno facility.	Professor, Toru Shimada +81-50-3362-2501	Professor, Toru Shimada +81-50-3362-2501	7 : 3

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8	The study and development of thin active phased array antennas	Recent satellites and spacecrafts trends to development of high performance satellite with an active phased array antenna. This type of antenna system requests functions of small-size, light-weight transceiver and receiver and a planar antenna. In particular, high efficiency and low-loss devices and circuits are necessitated. The purpose of this study is design, fabrication and measurement of an thin active integrated antenna transmitter and receiver array as a space electronic module. The active integrated antenna is made with semiconductor devices, MMICs and planar antennas. This technique is applied in order to realize the thin active integrated phased array radar in a small satellite and a solar sail satellite.	The semiconductor device and microwave and millimeter-wave technologies are requested in this study as foundations such as the design of semiconductor circuit, the test fabrication of an active integrated phased array antenna, the measurement of characteristics of the circuits and modules. In addition, you can study an advanced RF-ID tag, MIMO and modulation/demodulation analysis in terms of the system. Applicants are expected in the experience of use of the CADs and measurement equipments.	You can join Kawasaki research group and the DE communication and data transmission group. Equipments and CADs such as microwave circuit and EM simulators, measurement equipments, bonders, EB, and a clean room are available. You can use these tools under our regulations.	Professor Shigeo KAWASAKI +81-50-3362-9063	Professor Shigeo KAWASAKI +81-50-3362-9063	5 : 5
9	Research and develpment on surfarce exploration rovers on small solar system bodies	We seek for a motivated postdoctoral researcher to contribute to the on-going and the future rovers which explore the surface of small solar system bodies. Currently we are engaged in the development of a tiny rover system (named MINERVA-II) to explore over the small planetary bodies targeted by Hayabusa-2 mission. The technical issues involve mobile systems under microgravity environment, fully autonomous navigation, localization, and thermal control. We expect the postdoctoral researcher to participate in the development of the flight model of the rover system. In parallel with the development of the flight model on the authorized mission, we are promoting a future surface exploration rover proposed for domestic or foreign small planetary body missions. The future rover requires an sophisticated technology about mobile system, communication, localization and deployment from the mother spacecraft. We expect the postdoctoral researcher to make a feasibility research on the future technologies.	This position requires (1) a research background and a doctoral degree in the field of robotics, electrical engineering or artificial intelligence. (2) an experience on making an embedded system about the hardware design and development, as well as the onboard software implementation including the programming under realtime operation system and the development of digital circuits based on HDL/Verilog. (3) the daily research habit using UNIX operation system. (We do not need any Microsoft users) The applicants must clarify the above capabilities in their application form and possible interview.	The researcher will become a member of MINERVA-II team to cooperatively work for the development of the rover system before the launch of Hayabusa-2 spacecraft. During the contract period, the primary investigator on MINERVA-II who has an experience to install a small rover system to the past Hayabusa mission will supervise the activity. After the launch, the researcher will rather focus on the research on the technical issues required for the future mission based on the obtained experience on the robotics system on the surface of small planetary bodies.	Tetsuo YOSHIMITSU, Associate professor +81-42-759-8069	Tetsuo YOSHIMITSU, Associate professor +81-42-759-8069 or +81-42-759-8304	3 : 7
10	AKEBONO and GEOTAIL Data Analysis Studies in International Multi-Point Observations	Nowadays, there are a lots of magnetospheric observatories in the Earth's magnetosphere, such as NASA THEMIS, ESA Cluster-II as well as JAXA's AKEBONO and GEOTAIL satellites. Making well-organized multipoint simultaneous high-quality observation datasets provide a big jump for understanding the Earth's magnetosphere. Project researchers of this application are expected to contribute to international joint research of the magnetospheric multi-point measurement studies by maximizing AKEBONO and GEOTAIL results.	Project researchers are expected to promote data analysis studies using AKEBONO and GEOTAIL data in the international multi-point observations, under the condition where the latest datasets of a number of magnetosheric observatories, such as AKEBONO, GEOTAIL, Cluster-II, and THEMIS can be easily used. It is desirable to have English ability required for the abovementioned international research promotion.	The staff scientists of AKEBONO and GEOTAIL projects will collaborate with project researchers. The project researchers can use scientific datasets of AKEBONO and GEOTAIL as well as the data analysis computer fascility.	AKEBONO Project Manager Ayako Matsuoka GEOTAIL Project Manager Iku Shinohara +81-50-3362-7167(A. Matsuoka) +81-50-3362-3279(I. Shinohara)	AKEBONO Project Manager Ayako Matsuoka GEOTAIL Project Manager Iku Shinohara +81-50-3362-7167(A. Matsuoka) +81-50-3362-3279(I. Shinohara)	7 : 3
11	Research of new instrumentations for next-generation X-ray and gamma-ray observations	The Suzaku observatory which was put into the orbit in July 2005. There are many research themes utilizing the seven years of observations. The researchers are also expected to contribute in improving calibrations of the instruments and/or analysis software, and operations of the spacecraft.	Research experience in physics and astrophysics, data analysis in using UNIX computers.	The Suzaku project will provide all necessary data-analysis environment. We can support researches of various different fields in high-energy astrophysics, since there are six supervisors with different research interests.	Prof. K.Mitsuda, Prof. T.Takahashi, Prof. T.Dotani, Prof. M.Ishida, Asoc..Prof. N.Y.Yamasaki, and Asoc.Porf. M.Kokubun +81-50-3362-3621	Prof. K.Mitsuda +81-50-3362-3621	7 : 3
12	Research and Development on Scientific Payloads for Future Solar Missions	Applicants for this position shall participate in future Japanese space solar programs such as SOLAR-C and contribute to the relevant program through R&D studies of on-board scientific instrument(s). Towards SOLAR-C, ISAS solar physics group are now engaged in studying photon-counting soft X-ray telescope and its focal-plane detector, and are also developing high-reliability mechanisms allowing >10 million movements in space which are indispensable for observing continuously magnetic activities in the solar atmosphere. Applicants are requested to be engaged in either such R&D studies on scientific instruments that can bring break-through in future space solar physics, or in the development of on-board acquisition/processing systems for science data, performance evaluation on scientific instruments followed by detailed assessment on their science performance, or in the study on engineering aspects of the spacecraft system.	Applicants are requested to have good knowledge of physics or astrophysics. For applicants who aim to carry out engineering study, basic knowledge and research capability for the relevant area are required. It is desired that the applicants have experience in hardware R&D studies on physics and/or astrophysics. It is requested that the applicants can promote collaborative research activities with other groups inside or outside JAXA whenever needed. Those who have strong will to push next generation space solar physics forward through hardware development are highly welcomed.	ISAS solar physics group (SOLAR-B project) will supervise the research and it is possible to use various test facilities in ISAS. Meanwhile, collaborative research activities with solar physics group at NAOJ (with which ISAS solar group have years-long working relationship) as well as use of test facilities at NAOJ are also available and encouraged.	Associate Professor Taro Sakao Associate Professor Toshifumi Shimizu +81-50-3362-3718 +81-50-3362-4663	Associate Professor Taro Sakao +81-50-3362-3718	3 : 7
13	Development of the X-ray Satellite, ASTRO-H	ASTRO-H mission is the next major X-ray mission in Japan. ASTRO-H will carry two Hard X-ray Telescopes for the Hard X-ray Imager, and two Soft X-ray Telescopes, one with a micro-calorimeter spectrometer array with excellent energy resolution of <7 eV, and the other with a large area CCD in their respective focal planes. In order to extend the energy coverage to the soft gamma-ray region up to 600 keV, the Soft Gamma-ray Detector, which is based on the cocept of Si/CdTe Compton Gamma Camera, will be implemented as a non-focusing detector. Applicants are expected to participate in the project to develop these instruments and also to work on science achieved by the mission. Contribution to the mission-wide technologies such as data acquisition, data processing and satellite bus system is also the area of research. (For further information on the project, please visit http://astro-h.isas.jaxa.jp).	Background of physics or astrophysics, It would be desireable if applicants have some experiences on design and actual development of radiation detectors for X-rays and gamma-rays.	Reseach will be performed under supervision by professors in the department of high energy astrophysics and related departments. In addition to perform research in the field of high energy astrophysics, applicants can access cutting edge technologies implemented in the instruments to be onboard the ASTRO-H satellite. These technologies include highly advanced X-ray and gamma-ray detectors, Space Wire network, and analog VLSI.	Professor・Tadayuki Takahashi +81-50-3362-6448	Professor・Tadayuki Takahashi +81-50-3362-6448	3 : 7
14	Study on the upper atmospheric physics with the sounding rocket	In-situ observation of the lower ionosphere and thermosphere at altitude of 80-200 km can be made by the sounding rocket only, and therefore the limited data are available. However, it is becoming possible to approach various unresolved problems from new viewpoint due to recent advance on measurement technology By using the sounding rocket, the Institute of Space and Astronautical Science (ISAS) is trying to elucidate various phenomena occurring in the upper atmosphere where the neutral and charged particles coexist. The following subjects are expected in this study: 1) Development of a new instrument for the sounding rocket experiment. 2) Proposal and performance of a new sounding rocket experiment on the upper atmospheric physics 3) Study on the upper atmospheric physics with currently available data sets.	Professional knowledge on the thermosphere and ionosphere is required. It is desirable for a candidate to conduct the sounding rocket experiment by communicating cooperatively with staffs not only inside ISAS but outside JAXA. Also, we expect that a candidate aggressively approaches a development of the new instrument with his/her own idea and make a proposal of new experiment.	Professional knowledge on the thermosphere and ionosphere is required. It is desirable for a candidate to conduct the sounding rocket experiment by communicating cooperatively with staffs not only inside ISAS but outside JAXA. Also, we expect that a candidate aggressively approaches a development of the new instrument with his/her own idea and make a proposal of new experiment.	Associate Professor: Takumi Abe +81-50-3362-2645	Professor: Nobuaki Ishii (Director of Laboratory for the sounding rocket) +81-50-3362-3591	6 : 4

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15	Research on plant physiology and microbial dynamics in space environment	In order to clarify plant physiological sysytems in space, ground-based research shall be conducted by methods of molecular cell biology, and formed a plan of space plant expeiment. To grow plants efficiently, safely, and stability in space, next-generation plant cultivation system will be developed. And it also important to do research in microbial dynamics of biofilm and plant-related microorganisms. In addition, an utilization of microorganism such as probiotics will be studied.	It is necessary to have experience of plant physiology and microbial research and a promotion avilities of international coordination and to build a space experiment. It's better to be at home both in environmental science and in environmental microbiplogy. It's also desirable to have a daily conversation skill in English.	The staff includes 2 researchers and 3 technicians. The laboratory is so well equipped with various devices for nucleic acid or protein analyses, including laser ionization time-of -flight mass spectrometry and laser confocal microscope. It is available to use HPLC, UPLC, and cell culture facility. It is necessory to participate JAXA life science projects in cooperation with them, and to conduct your own research activities.	Professor, Noriaki Ishioka, Ph.D +81-50-3362-6072	Director, Masahiro Takayaangi, Ph.D +81-50-3362-6601	5 : 5
16	Experimental study on space plasma and hypervelocity impact	It is possible to study on space plasma and hyper velocity impact based on facilities at ISAS. Possible subjects for the studies are the following, and we welcome exploratory research also. (1) Plasma environment around space platform (2) Instrument development for observation in space (3) Wave phenomena in space plasma (4) Plasma heating phenomena due to nonlinear wave-particle interaction (5) Chemistry in the terrestrial and planetary upper atmosphere (6) Hypervelcoty Impact destruction (7) Elementary process of hypervelocity impact (8) Development of new instrument for advanced impact experiment (9) Development of impact spacecraft to the planetary surface	We expect a candidate who has experience on working experimental research related to the above or related subjects.. In particular, a candidate who enthusiastically promotes research by developing a new subject is very welcome. It is desirable to have experimental techniques such as building of measurement systems, making of electronic circuits, and working of test equipment tools,. Also, we encourage research in relation to data obtained by satellite or sounding rocket observations. It is also desirable for a candidate to be able to give good advice and insight for the researchers who come to our institute for the collaborational study.	The staffs of the Committee for Space Plasma Science provide a guidance. We have two main facilities; 1) Space plasma science chamber (2m diameter, 4m length), 2) hypervelocity impact accelerator (possible to launch the projectile with a veocity of 7km/s several times a day). It is possible to conduct very unique and large-scale experiment with these facilities.	Asoc prof.・Takumi Abe (Space chamber) Engineer・Sunao Hasegawa (Hypervelocity impact) +81-50-3362-2645(Abe) +81-50-3362-2859(Hasegawa)	Associate Prof. Takumi Abe (Chair of the Committee for Space Plasma Sciences) +81-50-3362-2645	6 : 4
17	Radiation Effects on Lattice-Mismatched Muiti-Junction Thin Film Solar Cells	Currently, JAXA is developing high-efficiency multi-junction thin film space solar cells using lattice-mismatched semiconductior system. However, the radiation effects including degradation mechanisms on such solar cells have not yet clarified and understood well. The degradation behabior or crystal defects creation is thought to be different from those of solar cells with lattice-matched systems. Thus, we will investigate the radiation effects on the lattice-mismatched solar cells, and then utilize the obtained knowledge to the high-efficiency solar cell development.	1. One must have the knowledge of the operation principle of a solar cell and its design concepts. 2. One must have the knowledge and the experience on semiconducter material growth and defect analysis. 3. One must have the knowledge on radiation effects in semiconductor materials and also an experience on irradiation experiment. 4. One should have a carrier of fundamental research in a university or a research institute after earning PhD. 5. One should have a carrier as a reseacher in a foreign contry and sufficient English skill.	You will have two supervisors who have PhD and sufficient carrier and experience for radiation effects on compound semiconductor solar cells. Irradiation tests can be performed using facilities such as accelerators at JAEA or Osaka Pref. Univ. with which have collaboration contract. You can also expect cooperation from the scientists working in this collabrative research. In addition, solar simulators, an EQE measurement system, a photoluminescence system, a SEM/EBIC system, a DLTS system, and a spectrophotometer are available at JAXA.	Mitsuru Imaizumi, Dr. +81-50-3362-7516	Mitsuru Imaizumi, Dr. +81-50-3362-7516	8 : 2
18	Active control of combustion instabilities in jet-engine combustiors.	Control of combustion instabilities is a major technological challenge in the development of low emissions (LPP type) jet-engine combustors. Conventionally, passive control strategies have been applied, such as attenuation of the thermoacoustic driving via modifications of the fuel nozzle design, or enhancement of the damping factor using resonators. However, the application of passive control is effective only over some narrow range of operating conditions. If the combustor's geometry or operating conditions change, then the passive control scheme must be redesigned. Therefore more robust control methods that are effective over a range of operating conditions are required. Active control strategies are a very promising solution to this problem, since a given controller is typically effective over a wide range of operating conditions. We therefore propose conducting both experimental and theoretical studies on active control of combustion instabilities. The research will be an important contribution towards the development of low emissions jet-engine combustors.	Sufficient knowledge of combustion instabilities in gas-turbine engines, including phenomenology of the instabilities and stabilization techniques, is required. Previous research experience of active control of combustion instabilities would be an advantage. The candidate must be highly motivated to develop new control methods.	Combustion tests will be conducted with research scientists from the Jet Engine Technology Research Center. JAXA's combustion test facilities will be made available for the research, including high-temperature, high-pressure test rigs. The research will require continuous collaboration with members of the Aviation Program Group. There will also be opportunities for collaboration (on combustion instability) with other research institutes.	Associate Senior Researcher, Shigeru TACHIBANA +81-50-3362-6291	Associate Senior Researcher, Shigeru TACHIBANA +81-50-3362-6291	7 : 3
19	ECLSS (air and water revitalization) for Manned Expolaration	Operation of the ISS has been extended until 2020. The research on environmental control and life support system(ECLSS) has progressed as a mission project. There is a limit to the supply of resources such in space station, Moon base and Mars base. In order to build the technology to reuse the material, circulation type life-support systems (especially focusing on air revitalization) is studied. i) Carbon dioxide separation and concentration from the atmosphere. ii) Water and methane are generated by the reaction of carbon dioxide and hydrogen (Sabatier reaction) iii) Oxygen is generated by water electrolysis Japan has advantage of environmental technology on the ground. JAXA should carry out study of environmental technology also in Space, including water revitalization.	It is desirable to have experience of analysis of gas and water. It is desirable to have knowledge of gas adsorption and desorption, catalysis, electrochemistry, chemical engineering. In addition, it is desirable to have a basic knowledge material balance, energy balance. It is desirable to have a wide range of knowledge and interest can combine studies and the project.	Research leader instruct directly. The experiment is carried out in cooperation with student trainees sometimes. Experiments on the air revitalization (CO2 removal device , CO2 reduction apparatus , water electrolysis equipment) Ventilation, Gas chromatography and mass spectrometer Experiments on the Water Reclamation	Accociate Senior Researcher Masato Sakurai +81-50-3362-2909	Accociate Senior Researcher Masato Sakurai +81-50-3362-2909	6 : 4