April 2014

Atomic Energy Researchers and Research Students Acceptance Program FY2014

Invitation to JAPAN

Application Guide

The Wakasa Wan Energy Research Center (WERC)
Fukui International Human Resources Development Center (FIHRDC)

WERC: http://www.werc.or.jp/enenews/pdf/pamphlet_english.pdf
FIHRDC: http://www.werc.or.jp/werc_english/introduction.htm
Email: international@werc.or.jp
Tel: +81-770-24-7272

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Contents

1. Outline

The Atomic Energy Researchers and Research Students Acceptance Program is a program to accept overseas researchers and research students, conducted by the Fukui International Human Resources Development Center (FIHRDC), the Wakasa Wan Energy Research Center (WERC).
This program is designed to invite overseas researchers and research students wanting to do research on improvements in nuclear safety and application technology, and to support their research at universities, company, institutes, and so on in Fukui. WERC will support their research by providing services, including flight and accommodation arrangements as well as paying related costs.
The specific course of this program is shown in Figure 1.

[Fukui]
This prefecture has various types of nuclear power plants, numbering 15, as well as training facilities and other nuclear related facilities. In addition, there are universities and institutes conducting atomic research, at which diverse studies are undertaken on nuclear safety technology and application technology. Fukui is an area that is advanced in atomic energy.

[WERC]
WERC is a foundation in Fukui, serving as an institute for research and development such as cancer treatment or selective breeding by using its accelerators while supporting industry, conducting exchange with researchers and engineers from home and abroad, as well as training personnel involved in atomic energy from home and abroad.

[FIHRDC]
This organization was set up within WERC in April 2011 to contribute to the development of safety technology and human resources for atomic energy. In addition to the implementation of this program, FIHRDC provides training for nuclear engineers from abroad and holds international nuclear conferences.

2. Aim

The aim of this program is to contribute to nuclear safety and application technology in the world while promoting international cooperation and interaction by accepting researchers and research students from other countries to universities, company, institutes and so on in Fukui prefecture.

3. Application requirements

Applicants can be divided into two: “researchers” and “research students”. The following are application requirements:

[Researchers]

(1) A person who has conducted related research over several years at institute, university and so on in his/her home country after finishing his/her doctoral course. Or a person who has a proven research performance and can be recognized as being equivalent to or greater than the above even if he/she has not finished any doctoral course.

(2) A person who engages in research regarding nuclear safety and application technology in his/her home country.

(3) A person who can contribute to nuclear safety and application technology in his/her home country after his/her return.

(4) A person who has sufficient language ability (in English or Japanese) so as not to pose a problem in research activities.

(5) A person who is in sufficient good health and spirits so as not to pose a problem in research activities in Japan.

[Research students]

(1) A master or doctoral student in his/her home country.

(2) A person who engages in research regarding nuclear safety and application technology in his/her home country.

(3) A person who can contribute to nuclear safety and application technology in his/her home country after his/her return.

(4) A person who has sufficient language ability (in English or Japanese) so as not to pose a problem in research activities.

(5) A person who is in sufficient good health and spirits so as not to pose a problem in research activities in Japan.

4. Research contents

[Researchers] Conduct research on the chosen research subject with researchers at the accepting institute in Japan.

[Research students] Conduct research on the chosen research subject under the guidance of instructors at the accepting institute in Japan.

5. Quota for acceptance

A few persons

6. Research period

Written in Table 3.
Note: Individual research periods will be notified after being determined by taking into account the research subject and the status of each researcher or research student.

7. Costs paid by WERC

See Table 1.

8. Accepting institutes

The universities and institutes accepting researchers and research students to conduct research in Fukui are shown in Table 2.

9. Application procedure

(1) Choice of research subject
Choose one research subject that matches your research field and promises sufficient findings from the research subjects shown in Table 3.
Note: Research subjects are classified as “RS: for both of researchers and research students”, “R: for researchers only”, “S: for research students only”.

(2) Preparation of application sheet
Complete the application sheet by following the form in Appendix 1.
Note: Incomplete paperwork may be rejected.
If you run out of space, make a copy of the form or widen the space or electric form and use it to provide the extra information.

(3) Preparation of official statement of institute/organization

Ask your appropriate superior, such as the head of your organization or your professor, to complete an official statement by following the form in Appendix 2.

(4) Preparation of medical certificate
Undertake a medical examination at a medical institution and ask the institution to complete a medical certificate by following the form in Appendix 3.

(5) Preparation of candidate's statement
Complete the statement by following the form in Appendix 4.

(6) Sending application
Prepare the official cover letter of your organization or use the form in Appendix 5, and attach it to the front of the four papers shown in Appendix 1-4. Fill out the cover letter in the name of your organization. An application in your personal name will be invalid.
Note: You can submit those application documents by e-mail.

10. Period for acceptance of applications

From 9th April To 5th June (Final due date) , 2014

11. Screening

Applicants will be screened by WERC.

12. Notification of the screening results

The screening results will be notified by WERC to applicants by e-mail. Successful researchers and research students will receive an acceptance letter and other related papers. Unsuccessful applicants will be informed of the result. Individual inquiries about screening and notification cannot be answered.
Schedule for notification: End of June

13. Obligations of accepted researchers and research students

Researchers and research students should make an application taking below criteria into consideration.

1. Withdrawal after receiving notification of acceptance will not be accepted.
2. The recipient have to submit the boarding pass of his/her fright tickets to WERC.
3. The recipient must follow the accepting institute's rules concerning entry into controlled areas, facility use, experiments, holidays and service, intellectual property rights, etc. during the research activities. The recipient will make a pledge as required.
4. The recipient will follow WERC's instructions concerning paperwork, travel, lodging at accommodation, etc.
5. The recipient will not commit any act of injustice, negligence or other improper behavior.
6. The recipient will not engage in any activities other than research, regardless of reward.
7. The recipient will not commit any human rights infringements (racial discrimination, gender discrimination, sexual harassment, academic harassment, power harassment, abuse, neglect, etc.).
8. If the recipient calls a family member or friend in your home country during your stay in Japan, the call will be considered to be outside of this program's responsibility such that WERC will neither pay the cost nor assume any responsibility.

9. In principle, temporary return or overseas travel for the reason of which not related to the research in Japan cannot be approved. However, if there are unavoidable grounds, the approval of the accepting institute and WERC should be obtained in advance of any travel. Any costs incurred shall be borne by the recipient.
10. When the recipient discontinues research due to unavoidable reasons, the approval of WERC should be obtained in advance.
11. If the recipient expects that research cannot be completed within the planned period, the matter should be reported to the accepting institute and WERC as soon as possible in order to receive instructions.
12. Upon completion of research, the recipient will submit a performance report by official form before returning home.
13. The recipient will not use the findings of research for any purpose other than improvement in nuclear safety technology and application technology.
14. If the recipient completes the procedure for intellectual property rights including industrial property rights, copyright, etc. concerning any invention or device based on his/her research, such matter must be reported to WERC as soon as possible by official form within 30 days from the end of the relevant fiscal year.
15. When commercialization of the results or exercise of intellectual property rights based on the recipient's research generates profit, you may be required to refund the grant you received in full or in part to WERC.
16. If the recipient doesn't obey the instruction of this guidance or WERC, acceptance of the recipient will be cancelled and appropriate compensation would be required as well as refund of any costs.
17. WERC and accepting institutes don't compensate any damage, a loss and injuries for the recipient.

14. Handling of personal information

Personal information included in applications is strictly controlled and only used for WERC's services. But there is possibility to use the information which is related to the research of successful researchers and research students could be made public such as WERC's web page, and so on.

15. Address for sending applications and contact information

Akira TANAKA
Staff
Fukui International Human Resources Development Center for Atomic Energy
The Wakasa Wan Energy Research Center
64-52-1, Nagatani, Tsuruga, Fukui, Japan, 914-0192
TEL +81-770-24-7272 FAX +81-770-24-2303
E-mail: international@werc.or.jp

Figure 1 Course of Atomic Energy Researchers and Research Students Acceptance Program

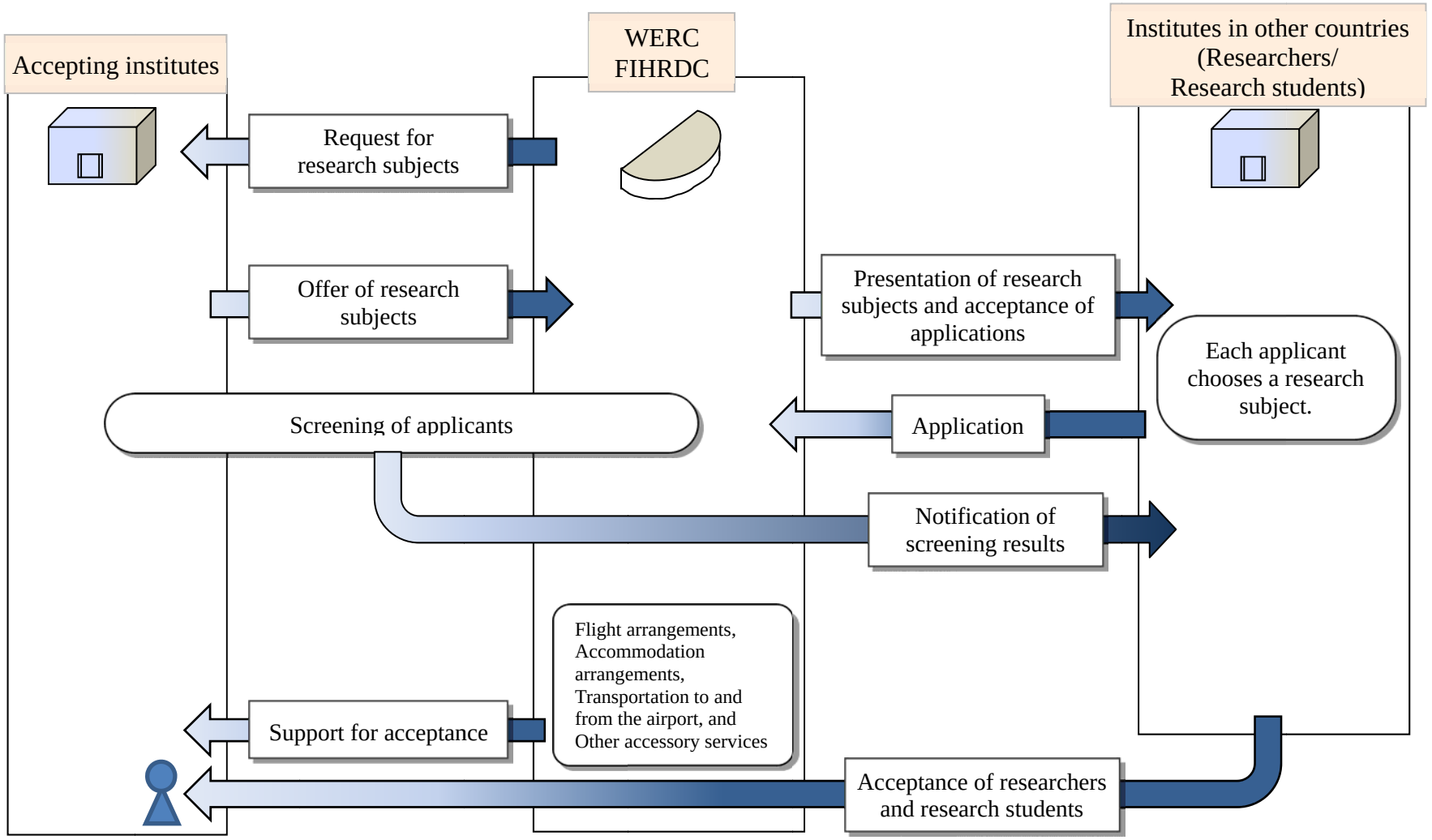

Table 1　Costs paid by WERC

Costs paid by WERC in this program	Content	Requirement
1. Travel costs		
A. Overseas travel costs	Provision of economy-class round-trip air ticket from a researcher's or research student's nearest airport to Japan	• The travel costs from a researcher's or research student's home to the nearest airport shall be paid by them self.
B. Domestic (inside of Japan) travel costs	Provision of train tickets from the airport to the closest station of the accepting institute Payment of domestic hotel bill during a travel if needed.	• The hotel bill is paid only when you have to stay near by the Japanese airport because of a travel schedule.
C. Daily allowance	Payment of a cash allowance of 5,000JPY per day **for researcher only** during his/her stay in Japan through this program	• This allowance shall cover the days from entry into Japan up to exit from Japan. • The allowance shall be paid monthly at the beginning of each month after being paid for the relevant month at the time of entry. • If the length of stay changes, this allowance shall be adjusted to the actual duration of stay even after payment.
2. Accommodation fees	Payment of accommodation fees during the stay	• Accommodation shall be a lodging house of the accepting institute or monthly rental apartment without having to pay a deposit or key money. • Accommodation shall be the equivalent of a furnished studios (including one-room apartments with a dining area and kitchen or with a kitchen only), selected by WERC. • Expenses for new furniture and supplies shall be paid by the researcher or research student. • Expenses associated with agreements shall be paid by WERC. • Compensation for damage during the stay shall be paid by the researcher or research student.
3. Commutation costs	Provision of commuter pass for public transportation between the accommodation and the accepting institute	• Commutation costs shall not be paid if the distance between an accommodation and an accepting institute is less than 2.0 km. • Public transportation shall not include taxis.
4. Medical examination fees	Payment of the costs of special medical examination in case of entry into a radioactive controlled area for the purpose of research	• Expenses for issuing a medical certificate required for application shall be paid by the researcher or research student.
5. Travel Accident Insurance	Payment of the travel accident insurance during your stay in Japan	• WERC decides the contents of insurance.
6. Academic fees	Payment of academic fees (entrance fee and tuition) **for research student only** when he/she was required to pay such fees.	• Academic fees shall be paid by WERC directly to the accepting institute before acceptance of the research student.

- Necessary costs for research such as the use and purchase of experimental installations or reagents shall be paid by the accepting institute in principle. However, expenses for what is privately owned by a researcher or research student shall be paid by him/her.
- All of above costs paid by WERC is limited only for the purpose of the research.

Table 2 Accepting institutes

The Wakasa Wan Energy Research Center (WERC) http://www.werc.or.jp/enenews/pdf/pamphlet_english.pdf
University of Fukui, Research Institute of Nuclear Engineering (UOF RIONE) http://www.rine.u-fukui.ac.jp/english/index.html
University of Fukui, Faculty of Medical Sciences (UOF FMS) http://www.med.u-fukui.ac.jp/home/ufms/eng/
Institute of Nuclear Safety System, Incorporated (INSS) http://www.inss.co.jp/e/index.htm

Table 3　Research subjects

【For both of Researchers and Research Students】

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
RS1	Researchers and Research Students	UOF RIONE	6 months
(Subjects) Environmental radiation monitoring in normal situation and in nuclear emergency situation			
(Abstract) The Fukushima nuclear accident had a new appreciation of the importance of monitoring radiation. In order to detect abnormalities in emergency, the measurement data from a usual time needs to be accumulated. When surrounding countries will have atomic power from now on not to mention the country which introduces atomic power, it is an indispensable measure in order to protect national health. In this research, the student learns about what kind of measure was taken after the disaster and learns radiation monitoring over 50 years in Japan. Through the data analysis of from normal and emergency situation, the student will learn about the importance of continuous radiation monitoring. Moreover, the present condition of radiation use in Japan can also be added into the theme by visiting some facilities.			

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
RS2	Researchers and Research Students	UOF RIONE	6 months
(Subjects) Reaction behavior of ZrO_2 coated Zr alloys with UO_2.			
(Abstract) Metal Uranium or the alloy of Uranium and Zirconium (called U-Zr alloy hereafter) forms by the reaction of UO_2 and Zirconium alloys inside the cladding tube around 1500 ℃ during a severe accident of light water reactors. The U-Zr alloy has melting temperature around 1000℃ and thus begins to melt at the temperature much lower than the melting temperature of UO_2, 2860℃ or that of Zr alloys around 1800℃. In the present study in order to avoid this melting at the lower temperature, ZrO_2 is supposed to be coated on the inside of the cladding. The reaction tests of UO_2 and ZrO_2 coated Zr alloy are performed and it is observed what kind of the reaction layer forms and whether the coated ZrO_2 increase the melting temperature or not.			

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
RS3	Researchers and Research Students	UOF RIONE	5 months
(Subjects) Survey Research on Risk Communication for the Health Effect of Ionizing Radiation regarding Fukushima Nuclear Accident			
(Abstract) In Japan, various activities concerning health effect of ionizing radiation which occurred after the Fukushima nuclear accident have been carried out. However, the sharing of information with overseas countries is still few. Nevertheless, the lessons learned from the Fukushima accident concerning risk communication issues related to sharing of information with foreign countries have been pointed out, dissemination of information in English is lacking. Transmission of information in English that tends to take a long time, however it is an important matter that cannot be lacking in order to obtain understanding and cooperation from the world. Therefore, accepting an application for the study of the following theme. (1) Conducting a survey of the literature research and field activities in Japan concerning risk communication on the health effect of ionizing radiation. The study will be carried out in collaboration with a small team of graduate students of University of Fukui, and the work to be translated into English. Then, the findings concerning the following item: (1) Current status and issues of risk communication on the health effect of ionizing radiation in Japan, will be expected to summarize as a research report. In the research, comparison with international standards such as "generic procedures for assessment and response during radiological emergency" issued by IAEA for example, will be expected. The applicant is expected that translation into their own language and utilize the research material will be compiled after returning home, providing in the related fields, to help with research activities in order to share information with other countries.			

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
RS4	Researchers and Research Students	WERC	3 months

(Subjects)
Recalibration of Position Monitors of Synchrotron using a Beam

(Abstract)
Position monitors are used for the measurement of the beam orbit in a synchrotron. The type of the monitor consists of electrodes located inner wall of a beam duct. Position of the beam is measured with the image charge induced by the beam.
Calibration of the position monitor is performed by applying pulse signal between the electrodes before the installation to the synchrotron. But the output of the monitor after the installation may be different from the one just at the installation because of the change of the electrostatic characteristic of the cabling and connection condition and/or loss of the gain of the amplifier. It is necessary to recalibrate the position signal by the detection of the accelerated beam.
The output signal of the position monitor is determined by the beam charge, the beam position, the response function and the amplifier gain. It is assumed that the response function depends on only the geometry of the pickup electrodes and can be evaluated by the calculation. For the variation of the output of the monitor so as to represent the change of the beam position and charge, the amplifier gain can be determined by using the non-linear least square method.

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
RS5	Researchers and Research Students	WERC	3 months

(Subjects)
Breeding of medicinal plants by ion-beam induced mutations

(Abstract)
To breed medicinal plants, the researcher brings materials (seeds, cultured tissues, etc…) from one's country, and studies the radiation response (eg. survival) of the plants after the irradiation of ion-beams (proton- or carbon-beams).
After studying the response, the researcher breeds the plants.
Materials of breeding are restricted to medicinal plants(except narcotics and psycotropic drugs), which can be imported to and exported from Japan.

【For Researchers only】

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
R1	Researchers only	UOF FMS	6 months

(Subjects)
Searching study of a sensitizing material and its sensitizing mechanism in the radiation (Innovation of Atomic Force Technology) fields using cancer cultivated cells and experimental tumor model mice.

(Abstract)
Among different techniques emerged for cancer treatment photodynamic therapy, boron neutron capture therapy and ionizing X-rays (PDT, BNCT & I-X) have been showing a great privilege on some critical cancers like brain tumors or head and neck tumors. For PDT, BNCT and I-X studies, the developments of a cancer cell or a tumor model and a specific sensitizer is a prerequisite. Through a joint collaboration with a Russian research group we have developed an unique sensitizer (compound-10B) which has been proved its efficacy against cancer cell growth both on activation by laser light illumination, ionizing X-rays and neutron striking after 24 hour of its administration in to the mouse model. Whereas on the cultured C6 cells it shows its entrapment into the cell after 2-3 hours of its application even in very lower concentration like in 10μM/ml. With this, it also reflected a significant reduction on the C6 cell growth when the cell culture has been illuminated by a laser light of visible range wavelength (665 nm). We suspect this reagent may generate the reactive oxygen species (ROS) in the cellular environment to explore its anticancer property upon activation through the light. For justifying our prediction it is needed to carry out some research like ESR (electron spin resonance) spectroscopy, SEM (scanning electron microscope), confocal fluorescent microscopy etc. for identifying different reactive species (e.g. OH-, O., etc.) generation along with cellular localization of the sensitizer element upon the activation over light illumination and/or neutron transfusion & ionizing X-rays (Proton). From this ground, it would be a great help if we get some opportunity again to use the synchrotron (ionizing X-rays) of the WERC and the BNCT experiment.

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
R2	Researchers only	INSS	3 month

(Subjects)
Material ageing of nuclear materials

(Abstract)
Lecture
- General knowledge relates nuclear reactor materials (including SG)
- Failure case of nuclear reactor materials
- Corrosion protection
- Material testing (Types and characteristics)

Research Case Studies
- PWSCC of Ni-based alloy
- PWSCC and IASCC of stainless steel
- Neutron irradiation embitterment of low-alloy steel
- Thermal ageing of cast stainless steel
- Fatigue

Tours and practical training
- Corrosion test, fatigue test and material test(Specimen processing, equipment operation, evaluation)
- Analysis by analytical instrument(Observation and analysis of the previously corrosion tested pieces)

【For Research Students only】

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
S1	Research Students only	WERC	3 months
(Subjects) Development of high energy proton beam application technique used for nuclear medicine			
(Abstract) Fundamental research on RI production techniques for nuclear medicine diagnostic will be carried out. To solve a insufficient amount of 99mTc compared to that of demanded, one has to consider a techinique to produce this radioisotope with ion beams. This program is aiming to research on this topic.			

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
S2	Research Students only	WERC	3 months
(Subjects) Surface hardening of aluminum alloys by ion implantation			
(Abstract) Aluminum has an advantage of lightweight, but has a drawback of being soft. Hardness is increased by adding other metals such as copper, magnesium and manganese, but basic property of being soft is not improved so much and the aluminum alloys are easily scratched. Then, irradiation with heavy ions is used to harden the surface of aluminum alloys because a large amount of materials can be treated in a short period of time by using heavy ion beams with low energies. Hardness is measured as a function of fluence for various aluminum alloys.			

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
S3	Research Students only	WERC	3 months
(Subjects) Development of DNA marker to improve efficiency in radiation-induced mutation breeding			
(Abstract) Development of a DNA marker for radiation induced mutants using RAPD and AFLP.			

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
S4	Research Students only	WERC	3 months
(Subjects) Analysis of radiation effects at molecular level on mutation induction of mammalian cells			
(Abstract) The objective of this study is to determine whether radiation-induced DNA damage, cell killing and mutation induction in mammalian cells are influenced by radiation quality. Response of mammalian cells at molecular level to gamma irradiation compared to ion beam irradiation will be investigated.			

(Research Code No.)	(Object Person)	(Accepting Institutes)	(Research Period)
S5	Research Students only	WERC	3 months
(Subjects) Improvement of high energy proton irradiation technique			
(Abstract) Development of computer program on high energy proton beam delivering into atmosphere from the accelerator will be carried out. In the meantime, On-the-job training of operation and maintenance of proton beam lines (or experiments) will be carried out.			