

Ministry of Education, Culture, Sports, Science & Technology (MEXT)  
"Program for Leading Graduate Schools"

# Phoenix Leader Education Program (Hiroshima Initiative) for Renaissance from Radiation Disaster



## Inquiry

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**HIROSHIMA UNIVERSITY**



# Global Standards Initiated by Hiroshima University

Director, Organization of the Leading Graduate Education program, Hiroshima University

## Mitsuo Ochi

President, Hiroshima University

In an increasingly globalized modern society, a variety of issues, including the widening economic gap, disaster and energy problems, global warming, and environmental pollution, present a threat to the sustainable development of humans across national borders. Since these issues are complexly intertwined with various factors, including history, society, culture, the natural environment, and technology, construction of a new knowledge system is necessary to find solutions.

In 2011, Hiroshima University established the Phoenix Leader Education Program (Hiroshima Initiative) for Renaissance from Radiation Disaster as one of the Programs within the Leading Graduate Schools supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). This program aims to develop global leaders who will be able to resolve the global issue of recovery from radiation disasters based on an interdisciplinary academic field transcending the traditional framework of academic and research disciplines.

In the process of contributing to the recovery of Hiroshima after the atomic bombing, we have developed as a compre-

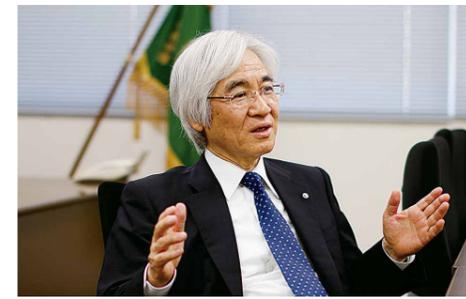
hensive research university with a unique mission based on our founding principle: "A single unified university, free and pursuing peace." Through this process, we have accumulated the results of research on the impact of radiation on human health and radiation medicine, as well as the results of social scientific research on disaster recovery. Since 2004, we have also worked to improve the radiation medical system in Japan as a national hub for radiation emergency medicine in case of a radiation disaster.

When the Fukushima Daiichi Nuclear Power Plant accident occurred in 2011, we dispatched radiation medicine support teams comprising over 1,300 staff members in total. Since then, we have been involved in various support activities to utilize our accumulated experience and knowledge to its fullest extent for the successful recovery of Fukushima.

Our Leading Graduate Education Program, which has been created based on this experience, is an important graduate level research program that is unique to Hiroshima University and builds on its stated mission. To further develop and enhance this program, the Leading Program Organization Steering Commit-

tee was established with our President as the director. The committee, comprised of the deans of all the university's graduate schools, is tasked with administering the program from a university-wide perspective.

Hiroshima University was adopted as one of the institutions designated under MEXT's Program for Promoting the Enhancement of Research Universities in 2013, and was subsequently selected as one of Japan's 13 universities for Category A of the Top Global University Project initiative administered by MEXT in 2014. Encouraged by this, we aim to become one of the world's top comprehensive research universities by further promoting our globalization. Through the Leading Graduate Education Program, with our concerted efforts, we intend to establish graduate education programs which serve as global standards to support the safety and security of people around the world. To develop human resources able to share in our aim, we have developed a graduate student support system that allows our students to be fully devoted to their studies. We welcome those willing and able to share our dreams and hopes.



## Grooming new leaders who can assist the recovery from radiation disasters in the international arena

Program Director  
**Kenji Kamiya**

University Vice President (Reconstruction support / Radiation Medicine)

Nuclear disasters cause health damage and environmental pollution by radiation. They also have a pervasive influence on people's minds and society, including reputational damage, and may even bring about the collapse of communities. Immediately following the Fukushima Daiichi Nuclear Power Plant accident, Hiroshima University has been engaged in reconstruction support activities, dispatching medical support teams to Fukushima Prefecture, and functioning as a hub for radiation emergency medicine in Japan. Through these activities, we have learned that the recovery from a nuclear disaster requires broad, interdisciplinary knowledge and skills drawn from a range of academic fields including radiation and medical science as well as environmental and social science. We have also realized that people able to grasp the essence of a situation from a broader perspective, and who possess strong will and the leader-

ship skills to confront these challenging issues are necessary for providing successful reconstruction support. Since nuclear disasters have an impact on a global scale, cooperation with the international community and international institutions is also indispensable for addressing such disasters.

To develop global leaders with these capabilities, the Phoenix Leader Education Program (Hiroshima Initiative) for Renaissance from Radiation Disaster was established through the mobilized efforts of Hiroshima University based on its historical experience, supporting Hiroshima's recovery from the atomic bomb, and the response and reconstruction following the Fukushima nuclear disaster. Students in the program acquire broad, interdisciplinary knowledge and skills, and are involved in creative endeavors to help resolve the issues which fall within

their specific areas of expertise. They deepen their practical knowledge through active participation in Fukushima and Chernobyl on-site fieldwork, as well as internship programs at the IAEA and other international institutions. Both faculty members and students devote maximum effort to building this exceptional research program, the only one of its kind in the world and unique to Hiroshima University, into an internationally-recognized and world-renowned graduate school program.

It is my sincere hope that as global leaders the students with a doctoral degree from this program will continue to inspire and support the residents of Fukushima Prefecture, will offer hope to those affected by disaster around the world, and will contribute to furthering the goal of a safe and secure global society.



## Connecting the "on-site" of radiation disasters with science

Program Coordinator  
**Masao Kobayashi**

Professor, Graduate School of Biomedical & Health Sciences

The Phoenix Leader Education Program (Hiroshima Initiative) for Renaissance from Radiation Disaster focuses on the "on-site" component of radiation disasters. This includes internships and fieldwork that take place in areas affected by nuclear power plant accidents. These internship and fieldwork programs provide students with the opportunity to consider the significance of their research for the disaster recovery process and to map out a clear career path for themselves. All students in the program obtain the essential

knowledge and skills for specialists working with radiation disasters, including radiation disaster medicine, environmental dosimetry, and risk communication, regardless of their specific field of study. In the Radiation Disaster Recovery Studies course, required for all students as an overall compilation of their efforts in the program, they prepare a report on learning achievement based on their individual subjects.

The program also offers students extensive opportunities to gain international

experience through training at the Radiation Emergency Assistance Center/Training Site, The Oak Ridge Institute for Science and Education in the U.S., an internship at either the International Atomic Energy Agency (IAEA) in Austria or the Nuclear Protection Evaluation Center (CEPN) in France. It is my genuine desire that through taking full advantage of this program, these students with their high aspirations, will grow as individuals able to connect science with the "on-site" experience of radiation disasters.

The Organization of the Leading Graduate Education program, Hiroshima University, was established with the aim of recruiting excellent students to our graduate schools and developing them into leaders who have the ability to uniquely address various issues and see through to the essence of situations based on the use of their extensive knowledge which transcends the traditional framework of academic and research disciplines. With our President serving as the director, all deans of graduate schools participate in the organization of this program as committee members.



## 'Program for Leading Graduate Schools' initiated by MEXT

The Program for Leading Graduate Schools works to establish and advance university graduate schools of the highest caliber by supporting dramatic reform of education programs to ensure that these degree programs will be recognized as exceptional worldwide. The overarching goal is to foster excellence among our students who are both highly creative and internationally attuned. In order for these students to play foundational roles in the academic, industrial and governmental sectors across the globe, the

program brings together top ranking faculty and students from both inside and outside of Japan and enlists the participation of other sectors in its planning and execution. This contributes to a seamless continuity between the master's and doctoral programs and the implementation of curricula that encompasses many fields of specialization. (from the Japan Society for the Promotion of Science website)

## Phoenix Leader Education Program

### Program Purpose

In response to the need for the development of specialists in the field of radiation disaster recovery, and with our related accomplishments and over 70 years of experience, Hiroshima University's "Phoenix Leader Education Program (Hiroshima Initiative) for Renaissance from Radiation Disaster"

intends to develop global leaders (Phoenix Leaders) who have the judgment and behavioral abilities to take appropriate action in the circumstances surrounding a radiation disaster and lead the recovery with a clear philosophy and innovative knowledge drawn from across many different disciplines.

### Capabilities Required for Phoenix Leaders

Three critical capabilities are required for the Phoenix Leaders, the global leaders of radiation disaster recovery.

#### [Global skills]

To be able to exhibit leadership in an international society

#### [Management skills]

To be able to gather a scientific understanding of the situation and lead the way to achieving a consensus for improving the circumstances

#### [Interdisciplinary skills]

To be able to observe the scene with a bird's-eye view and using a breadth of specialty knowledge from across many different disciplines and apply it where and when it's needed

### Personnel Development through Three Specialized Courses

Recovery from a radiation disaster includes three key elements: "protect human lives from radiation disasters," "protect the environment from radioactivity," and "protect children and society from radioactivity." This program develops specialists through the use of these three specialized courses of study and endows the Phoenix Leaders with a range of abilities, know-how and coping skills that allows them to successfully deal with the challenges they may encounter in a radiation disaster.

#### Protect human lives from radiation disasters

- Proper diagnosis and treatment of pathological conditions affected by radiation
- Evaluation of the mechanism and risks of carcinogenesis and genetic damage caused by radioactivity
- Assessment of the psychological effects of stress caused by the radiation contamination and delivery of mental care

#### Radiation Disaster Medicine Course

##### Personnel to be developed

Medical doctors, dentists, veterinarians, advanced medical specialists and professionals with knowledge and skills to respond to a radiation disaster

#### Protect the environment from radioactivity

- Proper analysis of nuclear fission reactions and the chemical properties of fission products
- Proper measurement, evaluation and analysis of environmental and food contamination
- Proper decontamination and disposal/preservation of radioactive waste

#### Radioactivity Environmental Protection Course

##### Personnel to be developed

Specialists in radiation protection and radiation safety who can measure environmental radiation and analyze the movement of radioactive material with the knowledge and skills needed for decontamination, and the handling and storage of radioactive waste

#### Protect children and society from radioactivity

- Alleviating social anxiety generated by radiation disasters and harmful rumors or misinformation
- Supporting the reconstruction of communities for affected people
- Construction of systems to support sound child rearing under the stress of radiation contamination

#### Radioactivity Social Recovery Course

##### Personnel to be developed

Specialists with knowledge of radiation risks and radiation protection, who can be involved in the improvement of risk communication and scientific literacy, and can contribute to community reconstruction and public policy making

# Curriculum Outline

## Learning Model by Course

We will foster Phoenix Leaders by continuous master's and doctoral programs of 4 years or 5 years.



### Radiation Disaster Recovery Studies

A subject to scientifically clarify the actual conditions of a radiation disaster by observing the situation in its entirety, and developing the ability to clearly present the issues facing reconstruction and potential solutions

### Phoenix Leader Special Subjects

Subjects allowing students to learn specialized knowledge and skills from each course of specialization. It is a requirement for all students. When taken by students from a different course, it contributes to them obtaining advanced interdisciplinary skills

### Long-term Fieldwork/Long-term Internship

A subject to foster and improve students' problem-solving ability and overall practical skills based on knowledge from specialized fields



### QE (Qualifying Examination)

An examination designed to judge whether the student has the requisite knowledge and skills to continue his/her studies in the program. A successful QE examinee in the 5 year course may obtain a Master Degree in his/her major

### Phoenix Leader Common Coursework

A group of subjects where students learn knowledge and skills from across various disciplines, such as radiation disaster risks, the effects of radiation, and the movement of radioactive material



### Short-term Fieldwork

A subject that includes practical training to better assess and understand the situation with a perspective drawn from across disciplines, and to identify the challenges facing the local site affected by a radiation disaster



### Phoenix Leader Foundation Subjects

Common subjects to learn basic knowledge and skills that are required for students of all disciplines in order to study in the Phoenix Leader Education Program

## Discipline-integrated Guidance and Consultation

For all students, primary advisers and co-advisers within the enrolled course, as well as the co-advisers from the other two courses guidance and consultation on research will be provided. The learning achievements of each student are evaluated by examiners from different academic fields as well as the program's partner enterprises.

## Collaborations to Foster Phoenix Leaders

The Phoenix Leader Education Program will provide opportunities for internships and practical training through its collaboration network of domestic and international industry-academia-government partners. Furthermore, specialists from major organizations participate in the program as faculty members, provide guidance to students, and offer advice as Phoenix Advisors with the goal of improving the program.

### Institutions and companies that provide internships and training

International Atomic Energy Agency (IAEA), International Commission on Radiological Protection (ICRP), Centre d'étude sur l'Evaluation de la Protection dans le domaine Nucléaire (CEPN, France), Institut de Radioprotection et de Sécurité Nucléaire (IRSN, France), Memorial Sloan Kettering Cancer Center, University of Pennsylvania, Nuclear Regulation Authority, Penta-Ocean Construction Co. Ltd., National Institute for Environmental Studies, Chiyoda Technol Corporation, Mazda Motor Corporation, Minamisoma Municipal General Hospital, National Institutes for Quantum and Radiological Science and Technology



## Message from Phoenix Advisers



**May Abdel-Wahab** Director of the Division of Human Health, International Atomic Energy Agency  
Visiting Professor of Hiroshima University

As a visiting Professor at Hiroshima University, I am familiar with the excellent teaching and students in the Phoenix Leaders program. The Phoenix Leaders program students will contribute to fulfilling a significant need for global leaders and trained personnel in radiation recovery. The program is unique in that it provides hands-on practical experience and research. In addition to the core curriculum, it includes diverse specialization, whether in radiation medicine, environment and social recovery. In addition the students are provided ample opportunities for international experience through internships at the IAEA and other venues. The quality of the students, supported by the experienced leadership from the Hiroshima University contributes to the success of the program.



**Jacques LOCHARD** Vice-chair of the International Commission on Radiological Protection (ICRP)  
Visiting Professor of Hiroshima University

Living in a contaminated area following a nuclear accident is a complex situation that raises many questions and concerns among the affected population. The presence of the contamination in the direct environment of people is profoundly affecting all dimensions of their living conditions. In such a context the objective is not only the protection of people against the potential health consequences of radiation, but also the maintenance of sustainable living conditions including respectable lifestyles and livelihoods. The Chernobyl and the Fukushima experiences have shown that the lack of direct engagement of the affected people

in the process of rehabilitation of their living conditions inevitably leads to a shared feeling among them of loss of control over their daily life, exclusion and abandonment, disqualification of their living places and also of deep mistrust vis-à-vis experts and authorities. How to reduce the complexity characterizing post-nuclear accident situations? How to avoid perverse mechanisms inducing distrust, loss of autonomy and de-mobilization of the affected population? These are the main challenges associated with the rehabilitation of living conditions in contaminated territories after a nuclear accident. Addressing these challenges is not only a matter of science, technology and standards, it is also a matter which call for respecting the fundamental values of freedom, justice and dignity of the affected people.

In this respect, the Phoenix Leader Education Program (Hiroshima Initiative) for Renaissance from Radiation Disaster is a unique doctoral program offering to students from all over the world a comprehensive insight of the scientific and human dimensions of a nuclear accident.

## Admission Policy

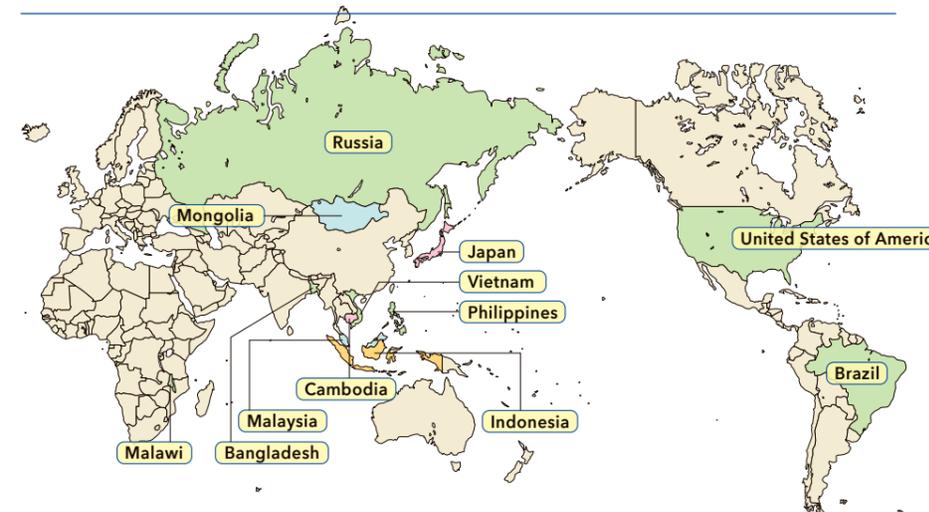
The prospective applicants should include those:

- (1) who wish to contribute to social development with interdisciplinary knowledge and skills
- (2) who understand the suffering of others and wish to contribute to radiation disaster recovery
- (3) who wish to be leaders playing an active role in regional and global society
- (4) who have enthusiasm, determination, responsibility and people skills

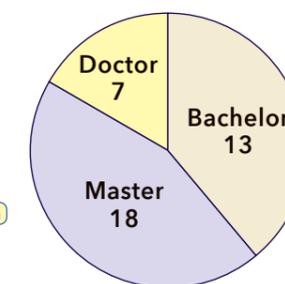
## Background of the Students

Students from a variety of countries study, research, and develop together.

### Student's Home Countries



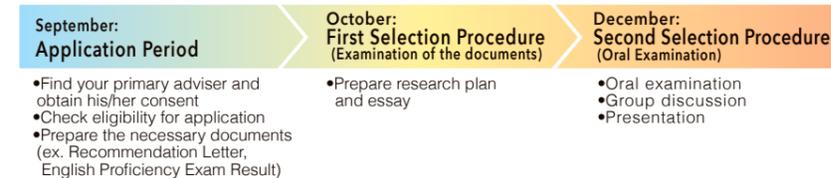
### Educational Background of the Students



※Since the Radioactivity Environmental Protection Course and Radioactivity Social Recovery Course are five-year Doctoral Courses, the students enrolled in these courses must begin from a Master Course level.

## An Overview of Candidate Selection Methods

Based on the admission policy, the program has the following selection methods: Oral examination (Second selection) will be conducted in English



※For the Radiation Disaster Medicine Course, "special selection" is available for applicants who have a Japanese physician's or dentist's license.  
※Please check the information on our homepage (<https://www.hiroshima-u.ac.jp/phoenixlp>) for the latest selection schedule.

Course	Training Program	Number of Students
4-year Course	Radiation Disaster Medicine Course	Several Students
5-year Course	Radioactivity Environmental Protection Course	Several Students
	Radioactivity Social Recovery Course	

## Student Support

### Financial Support (until March 2018)

Students enrolled in the Phoenix Leader Education Program will receive the following financial support in accordance with University regulations.

- (1) Scholarship without repayment requirement (from 180,000 yen to 200,000 yen / month: estimated).
- (2) Research Grant (For the students who have passed the Qualifying Examination): maximum amount of 500,000 yen per six months.
- (3) Other expenses that may be necessary for students to conduct their studies will be provided within the allotment set by this program.

※The above financial support will come to an end on March 31, 2018.

### Various Support Programs

The Phoenix Program has introduced a number of support programs to ensure an environment that allows the program's students to focus on their studies and research activities.

#### Learning e-portfolio

Students are able to receive direct feedback and advice from both their primary advisor and co-advisors regardless of time or place.

#### Mentor system

Faculty, senior students, and administrative staff will answer the questions that arise during the student's academic life.

#### Career path support

Provide advice on institutions for carrying out internships, offer educational seminars led by leaders from different academic fields and industrial sectors, etc.