

## Medical Physics Educational Program

### ■ What is a Medical Physicist?

A medical physicist in Japan is a medical professional who contributes to medical care from the standpoint of a specialist in medical physics by ensuring that medical care involving radiation is properly performed. In radiotherapy, medical physicists optimize treatment plans working with physicians, and conduct quality control and verification of the actual medical application working in concert with physicians, clinical radiological technologists, and radiotherapy quality control specialists. Medical physicists also confirm the accuracy of the position and doses administered to the patient body, ensuring that they are within the clinically required range, and that the treatment is performed as prescribed by the physicians. They also engage in medical physics research and development related to radiotherapy. For matters related to diagnosis and nuclear medicine, they work with physicians, ensure the maintenance of a clear balance between effectiveness and safety of diagnoses, and conduct quality control and verification of the diagnostic apparatus and images, working in concert with the clinical radiological technologists. They also engage in medical physics research related to diagnostic radiology.

1,371 medical physicists (as of December 2, 2021) and 79 therapeutic medical physicists (as of April 1, 2022) have been certified in Japan by the Japanese Board for Medical Physicist Qualification, and they are actively working in various fields including education, research, clinical settings, and research and development in industry.

### ■ About the Program

This has been accredited as a medical physics education course that meets lecture/clinical standards complying with the education curriculum guidelines set by the Japanese Board for Medical Physicist Qualification (JBMP). Those who have completed this course are given preferential treatment in gaining certification as a medical physicist.

The program includes the Master's Program, the Combined Master's and Doctoral Program and the Doctoral Program. The medical physicist examination is conducted in Japanese.

For more information about the curriculum, please refer to this page

(<https://www.med.hokudai.ac.jp/en/bme/medical-physicists.html>) on our website. And for further information about medical physicist examinations and accreditation as a medical physicist, please refer to the website of the JBMP (<http://www.jbmp.org/english/>).



Staff of the Medical Physics Educational Program  
**SUZUKI Ryusuke**  
(Specialized in Clinical Medical Physics / Medical Physicist)

## Medical Device Development Program

(Master's program only)

This program aims to train scientists who will be engaged in research and development mainly on diagnostic and therapeutic equipment using radiation. With the educational curriculum designed for acquiring advanced engineering knowledge, students must learn basic subjects related to the characteristics and functions of the human body as well as subjects related to biomedical engineering such as the influence of radiation on the human body, this knowledge is necessary for research and development of medical equipment. Students also have to learn applied subjects related to designing medical equipment, and handling of medical images and information. A "Certificate of Completion of the Medical Device Development Program" will be awarded to successful students.

Please contact the academic affairs section of the graduate school (d-tanto@med.hokudai.ac.jp) for detailed information about the program.



### Message from a Certified Medical Physicist

#### To Those Aspiring to Become Medical Physicists

I entered the doctoral program at the Graduate School of Medicine, Hokkaido University in 2016, the year before the Graduate School of Biomedical Science and Engineering was established. The curriculum of the Medical Physics Educational Program covers the content of the medical physicist certification exam, and I received ample training in clinical practice, especially quality control and assurance. I was also able to do medical physicist work related to real-time tumor-tracking and proton beam therapy, which are unique features of Hokkaido University. Such experience was not only helpful to prepare for the medical physicist certification exam, but also provided many insights for my own research.

I completed the doctoral program in 2020 and am currently working in research and development of diagnostic medical devices at a company. Although my specialty within the field of medical physics has changed from radiation therapy to diagnostic imaging, the knowledge and experience I have gained through the Medical Physics Educational Program is used in many aspects of my daily work.



Philips Japan, Inc.  
MR Clinical Scientist  
Division of Medicine (Doctoral Program),  
Hokkaido University Graduate School of Medicine  
(graduated in March 2020)  
**KWON Jihun**

## Message from an International Student



2nd-year Doctoral Student  
Quantum Biomedical Science and Engineering Course,  
Department of Medical Applied Basic Physics,  
**DAMDINSUREN Gantumur**  
[Mongolia]

### Don't overlook present opportunities and miss out on future success

I am enrolled in the doctoral program of the Graduate School of Biomedical Science and Engineering at Hokkaido University in Japan, which is one of the advanced countries in nuclear energy, industry, technology, and engineering in the world.

In recent years, radioisotopes and radioactive materials have been widely applied in nuclear medicine for both diagnosis and therapy. The main processes whereby medical radioisotopes and radioactive materials are produced, are through neutron activation, nuclear fission, charged particle-induced reactions, and radionuclide generators. Our research team focuses on the measurement of nuclear reaction cross-section (probability) in the production of medical radioisotopes using charged particle-induced reactions in cyclotrons. Our results contribute to expand the nuclear reaction database for optimization of the production routes of medical isotopes.

I realize that this program is of invaluable importance for my future career. I can truly recommend the Graduate School of Biomedical Science and Engineering at Hokkaido University as a key to professional knowledge, skills, one's future career, and success.

### Number of International Students

(Data as of March 1, 2022)

### ■ Distribution by Country/Region

Area	Country/Region	Number
Asia 6 students(75%)	China	4
	Mongolia	1
	Thailand	1
Africa 2 student (25%)	Nigeria	1
	Ghana	1
TOTAL		8

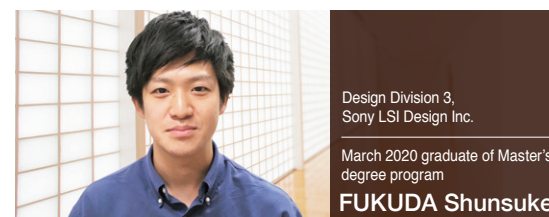
### ■ International Student Numbers by Graduate Program ( ):number of female students included

Master's Program	Doctoral Program
3 (0)	5 (0)

### ■ Methods of Financial Support

Japanese government	0
Self-Supported	8
TOTAL	8

## Messages from the Former / Graduated Students



Design Division 3,  
Sony LSI Design Inc.  
March 2020 graduate of Master's degree program  
**FUKUDA Shunsuke**

### Understanding the Joy of Manufacturing

I was interested in developing medical devices when I majored in radiation during undergraduate school, so I went on to the Graduate School of Biomedical Science and Engineering. My research theme during graduate school was the development of PET equipment that can be attached to radiotherapy equipment. In PET equipment, signal processing is performed by HW to process a large amount of radiation event information instantly, and my research activities focused on the design of signal processing circuits. I was able to work on this theme for two years and I believe this was a very valuable experience.

While I encountered numerous issues in design and development, that experience helped me expand the scope of my job search, which led to my current occupation as a circuit design engineer. In my graduate school life, I learned the joy of manufacturing and was able to expand my job search options. I think this kind of experience is one of the appeals of the Graduate School of Biomedical Science and Technology.



postdoctoral researcher,  
Global Center for Biomedical Science and Engineering,  
Hokkaido University  
March 2022 graduate of Doctoral Program  
**NISHIOKA Soichiro**

### Attractiveness of Fusion of Different Fields

I received my master's and doctoral degrees from the Graduate School of Biomedical Science and Engineering. Here I studied the mechanisms of cancer cell resistance to radiation at the molecular level. It was fulfilling to make discoveries that lead to further discoveries. I wish to remain at the university and contribute to advances in medicine through cell biological research.

The strength of this graduate school is that experts in the diverse fields from both biological and physical sciences collaborate to solve medical problems, and opinions can also be exchanged with those engaged in both basic and applied clinical research. Professors at the Graduate School of Biomedical Science and Engineering are enthusiastic about both education and research, and support students to cultivate expertise in their field, learn to conduct research, and obtain communication skills while working hard in a favorable environment. If you are interested, please feel free to visit the laboratory and see the research content, feel the atmosphere, and get to know the personalities of the members.