

## 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.

As of April 1, 2020, 1,228 medical physicists 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)

### Message from a Medical Physicist

## Qualification as Medical Physicist is Required for Radiotherapy

There has been an increase in the demand for medical physicists for treatment planning and quality assurance to ensure safe radiotherapy treatments as well as the development of the therapeutic and diagnostic fields.

I decided to obtain the qualification, wishing to be engaged in treatment from both the medical and physical standpoints. In this medical physics course, I was able to acquire the knowledge and skills necessary for the qualification, through lectures and clinical training in medical physics, and I obtained the qualification during my studies.

In recent years, the qualification has been a requirement to be able to work as a medical physicist in hospitals providing advanced radiotherapy such as IMRT and particle beam therapy. I think that the need for staff having this qualification will increase as these treatments develop and become more commonly available. The knowledge acquired while studying for the qualification was also useful in my research (dose simulation) at the graduate school and postdoctoral period in Netherlands Cancer Institute.

I recommend you to obtain the qualification as medical physicist by studying at the medical physicist courses here.

(As of April 2020)



Medical physicist, Department of Medical Physics, Hokkaido University Hospital  
Division of Medicine (Doctoral Program), Hokkaido University Graduate School of Medicine (graduated in March, 2017)  
**KANEHIRA Takahiro**

## 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](mailto:d-tanto@med.hokudai.ac.jp)) for detailed information about the program.



## Messages from International Students

The following are the messages from students who completed the master's program in fiscal 2018 and international students currently enrolled.



2nd-year Doctoral Student  
Molecular Biomedical Science and Engineering Course,  
Department of Medical Image Analysis  
**TSOODOL Zolbadral**  
(Mongolia)

To develop professional skills in a world-class research environment.

I am from Mongolia and a doctoral course student at the Graduate School of Biomedical Science and Engineering (BME), Hokkaido University. This university has a unique program that allows us to study a wide variety of knowledge in different fields, such as medicine, engineering, and basic sciences in collaboration with staff on the latest facilities and using innovative technologies.

As an illustration of the multidisciplinary research activity at BME, Hokkaido University, I would like to point to my research topic which focuses on the production routes for crucial medical isotopes and radioactive nanoparticles, used for advanced techniques such as PET, SPECT, and multimodality imaging in the medical diagnostic sector. As a part of the research, I am engaged in nuclear reaction experiments to measure the produced cross-section of medical isotopes from charged particle accelerators.

Finally, I recommend you not to miss a great opportunity to develop professional skills and to carry out high-level research in the world-class research environment at this university.

(As of April 2020)



3rd-year Doctoral Student  
Molecular Biomedical Science and Engineering Course,  
Department of Molecular Oncology  
**Hossain Elora**  
(People's Republic of Bangladesh)

My research work makes me enthusiastic to learn and explore more

I've decided to pursue a postgraduate degree as a result of finding research motivating, innovative and challenging during my master's program. I came to Hokkaido University for its worldwide impact, and was interested in working with my supervisor Dr. Fumihiro Higashino, for genetically engineered oncolytic virus and for work in the molecular oncology program. As Japan is culturally rich and devoid of any kind of racism, this pulled me to enjoy having a collaborative environment.

I am working with a newly developed oncolytic adenovirus, which is genetically engineered for enhancing its efficacy. I am also working with some combination approaches like chemotherapy and radiation.

Hopefully I will be able to contribute something valuable to society after pursuing my PhD. My research work makes me enthusiastic to learn and explore more. I will definitely continue my learning.

There are many amazing aspects of BME; continually learning, exploring and interacting with interesting and talented people is a great privilege. Beside people here are very welcoming and helpful.

(As of April 2020)

## Messages from the Former/Graduated Students



Engineer, Dept. of Nuclear Business, Hokkaido Electric Power Co., Inc.  
March 2019 graduate of Master's degree program  
**ICHIKAWA Seiya**

A quest for potentially superior abilities

I started research into artificial intelligence (AI) after I enrolled in the Graduate School of Biomedical Science and Engineering. The research I was engaged in is a technique to automatically identify tumor sites in brain images using AI. I expect this technique will shorten the time spent on diagnosis, and reduce the burden on extremely busy physicians.

I have spent school life on a variety of classes such as radiation, patent application, and image analysis as well as my research activities. While studying at the graduate school, I came to wish to work in the nuclear power generation field. By integrating the knowledge of radiation gained from the medical field and the knowledge in the field of nuclear energy that I will learn in the future, I look forward to seeing how knowledge about radiation changes.

Even if you have no clear future vision like me in the past, you can identify your aptitude and find a goal you want to challenge. Why don't you quest for your potential ability?

(As of April 2019)



2nd-year Doctoral Student  
Molecular Biomedical Science and Engineering Course,  
Department of Molecular and Cellular Dynamics Research  
March 2019 graduate of Master's degree program  
**NISHIOKA Soichiro**

Study cancer cells to enhance therapeutic effect

I learned molecular and cell biology at undergraduate school, and then entered the Graduate School of Biomedical Science and Engineering to do research related on cancer treatment. Radiotherapy is widely used for the treatment but some cancer cell types have resistance to radiation treatment. Why are they resistant to radiation? To investigate the question, I have studied molecular mechanisms on the radiation tolerance of cancer cells. This field still has many wonders, so it's very interesting.

We are under an excellent environment supported by faculty members who are enthusiastic in research and education. My skills of research and communication were fostered in master's program, and I have been advancing my research in the doctoral program. I wish to contribute to the progress of cancer treatments in the future.

If you are interested in, why don't you visit our laboratory?

(As of April 2020)