

RADIATION RESEARCH IN ONCOLOGY

HIRO and OncoRay Lecture Series 2025/2026, part 2

From October 2026 until June 2027, we will continue with the second part of our lecture series, taking place online on Zoom.

Everyone from DKFZ, OncoRay, DKTK and other associated partners are welcome! PhD students of DKFZ please register online via the Training Portal.

TOPICS AND DATES

1. Particle Radiotherapy (Prof. Dr. Oliver Jäkel)

Thursday, 29.10.2026, 5:00 – 6:30pm, online via Zoom

The seminar introduces the rationale and fundamental principles of proton and ion beam radiotherapy. A brief historical overview is provided, together with an introduction to existing particle therapy facilities. The lecture further reviews the current state of the art in radiation sources and discusses recent advances in radio-frequency accelerator and laser-based technologies. Finally, selected clinical applications and the available clinical evidence are presented.

2. Fundamentals of Radiologic Imaging (Dr. Sophia Blum)

Thursday, 26.11.2026, 5:00 – 6:30pm, online via Zoom

This lecture reviews basic techniques of imaging and image interpretation in radiology including radiography, fluoroscopy, ultrasound, computed tomography and magnetic resonance imaging. Additionally, combined imaging techniques, namely PET/CT and MR/PET, as well as imaging analysis tools (e.g. semi-automated image analysis and computer aided diagnostics) are presented.

3. Imaging Technology I (Prof. Dr. Marc Kachelrieß)

Thursday, 17.12.2026, 5:00 – 6:30pm, online via Zoom

Macroscopic imaging in medicine is based on several physical principles ranging from ultrasound to ionizing radiation coming from sources outside or inside the patient. Accordingly, the questions to be answered by the different methods and the content of information of the resulting images are quite different. In Imaging Technology I, the physical and technical principles of *computed tomography (CT)* and *positron emission tomography (PET)* will be presented.

4. Imaging Technology II (Prof. Dr. Mark Ladd)

Thursday, 28.01.2027, 5:00 – 6:30pm, online via Zoom

Macroscopic imaging in medicine is based on several physical principles ranging from ultrasound to ionizing radiation coming from sources outside or inside the patient. Accordingly, the questions to be answered by the different methods and the content of information of the resulting images are quite different. In Imaging Technology II, the physical and technical principles of *ultrasound (US)* and *magnetic resonance imaging (MRI)* will be presented.

5. Cancer Stem Cells and Radiotherapy (Prof. Dr. Anna Dubrovská)

Thursday, 25.02.2027, 5:00 – 6:30pm, online via Zoom

This lecture will review the clinical perspectives of cancer stem cell research in radiation oncology including (i) the 5R's of radiotherapy in the light of cancer stem cell biology, (ii) cancer stem cells as predictive and prognostic biomarkers, (iii) cancer stem cell heterogeneity and plasticity of cancer stem cell state and (iv) development of anti-cancer stem cell therapies for tumor radiosensitization.

6. From Data to Models: AI in Radiation Oncology (Prof. Dr. Steffen Löck)

Thursday, 18.03.2027, 5:00 – 6:30pm, online via Zoom

This lecture introduces the fundamentals of AI modelling, from data collection and preprocessing to training, validation, calibration, and performance assessment. Using examples from radiation oncology, it highlights key concepts, common pitfalls such as overfitting, and the opportunities and limitations of AI-based approaches.

7. Radiation Response of Normal Tissue (Prof. Dr. Christian Karger)

Thursday, 29.04.2027, 5:00 – 6:30pm, online via Zoom

Normal tissues are inevitably included in the high dose volume of radiotherapy, predominantly within the tumor and surrounding normal tissue, thus bearing a certain risk of early and/or late complications. The radiation response of normal tissues and its dependence on treatment parameters and biological factors, e.g. dose, fractionation protocol, overall treatment time as well as the impact of the irradiated tissue volume will be discussed. Current strategies to model and to ameliorate radiation effects in normal tissues will be presented.

8. Tumor Radiobiology (PD Dr. Rebecca Bütof)

Thursday, 03.06.2027, 5:00 – 6:30pm, online via Zoom

This lecture gives an overview on the biological effects of ionizing irradiation in tumors. Tumor response parameters to radiotherapy and biological factors of radiation resistance of tumors are presented.

9. Fundamentals of Nuclear Medicine (Prof. Dr. Matthias Miederer)

Thursday, 24.06.2027, 5:00 – 6:30pm, online via Zoom

Tracer principle is the basis of radionuclide application which includes molecular imaging and therapy. This lecture explains the application of specific radiotracers for visualization of physiology and specific changes in blood flow, metabolism as well as transporter or receptor state depending on disease and its genesis. Clinical applications of FDG-PET are explained in tumor, inflammation and degeneration. The lecture gives an overview on cancer therapy with special focus on thyroid carcinoma.

End of the lecture series!

As of Jul. 17, 2026