

# New Approaches for Radiotherapy

With the approach of viewing radiotherapy as a multi-criteria optimization task, our researchers have significantly advanced the medical treatment of cancer in recent years. The “Patient Positioning” project aims to set further standards in the fight against cancer. An interview with Dr. Philipp Süß, from the “Optimization Technical Processes” department.

## Why does the project put “Patient Positioning” to the test in radiotherapy?

The planning of radiation therapy begins with a detailed computed tomography (CT) scan. The treating physicians use this CT image to plan the dose with which they will irradiate a tumor. The problem is that the location of critical organs and tumors on the day of treatment are no longer identical to those on the plan CT, for example because the stomach or bladder fill varies. Reconstruction is very difficult, but significant in determining the dose the person will receive on the day of treatment. Many therapy devices nowadays offer the possibility of recording a less detailed CT immediately before the start of radiation in order to adjust the position on the day of treatment as close as possible to that of the previous recording.

## Can the treatment be adjusted at such short notice?

Yes, the planned daily dose can be adjusted according to the acute condition of the person to be treated. The dose becomes more important than the image. This is exactly where we come in: We want to ensure more effective treatment by shifting the focus away from the image to dose control. To do this, we are developing a software solution that compares the current image with the previously acquired one and formulates an updated recommendation for the radiation dose. Currently, hospitals are looking at how to correct the patient setup based on



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*The software developed by ITWM researchers shows the calculated dose in color, which can be optimized with a slider.*

the difference between the current CT image and the planning CT. We are trying to reconstruct the planned dose.

## What stage is the project at?

Quite far along. Our industrial partner Varian Medical Systems has commissioned a software prototype, and the basic feasibility is given. The software is now being tested at Rutgers University Hospital in New Jersey using image data from past patients. In this way, we want to verify that the method brings the desired benefits, but also to test the workflow. For staff performing radiation, the usual workflow changes when they use the software to look at the dose rather than just the image.

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