

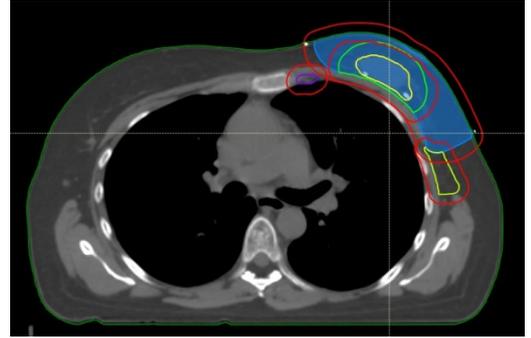
Graduation assignment:

Optimization of breast cancer patient treatment plans

Local supervisor:

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Introduction

Patients with cancer can be treated in various ways, usually with a combination of surgery, chemotherapy, immunotherapy and radiotherapy. With radiotherapy, a high radiation dose is given to the tumor while sparing the surrounding tissue as much as possible. For breast cancer patients, the dose given to the breast needs to be balanced against the dose given to the lungs and the heart. Based on international guidelines, the number of irradiation fractions and the nominal dose per fraction is harmonized. However, in current practice on use is made of previously generated treatment plans. Also, the optimization does not take the position of the primary tumor into account or patient related cardiac morbidity risk factors.

Main research goal:

To automatically determine the optimal individual breast cancer radiotherapy treatment plan based on the position of the primary tumor and the individual cardiac morbidity risk factors.

Your contribution

You will:

- Develop and implement methods to optimize treatment plans based on the location of the primary tumor and the individual cardiac morbidity risk factors. This might include some scripting in python.
- Quantify the reduction in cardiac toxicity resulting from this individualized optimization.
- Develop and validate the generation of new plans based on previously generated plans using a large clinical database of plans and artificial intelligence solutions (based on software tools available in the research version of our planning system)
- Compare the results with similar results as reported in the literature and co-write a scientific publication of the results.

Your gain:

- You will be able to attend educational sessions at the department and see the whole process of patient treatment preparation and execution.
- You will acquire comprehensive knowledge on and experience in the work of a medical physicist in a radiation therapy department, focusing on breast cancer treatment.
- You will have the possibility to co-write a scientific paper.
- Your work will lead to a directly implementable improvement of the treatment of breast cancer patients.