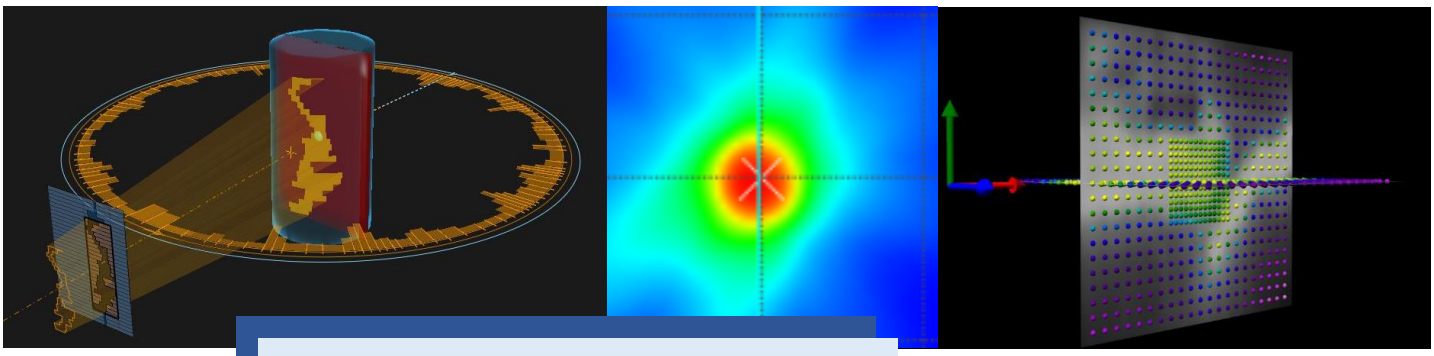


PhD Student (f/m/d)

Would you like to work be a part of a driving force for a paradigm shift in radiotherapy?
Join our international team working on the development of upright radiotherapy!

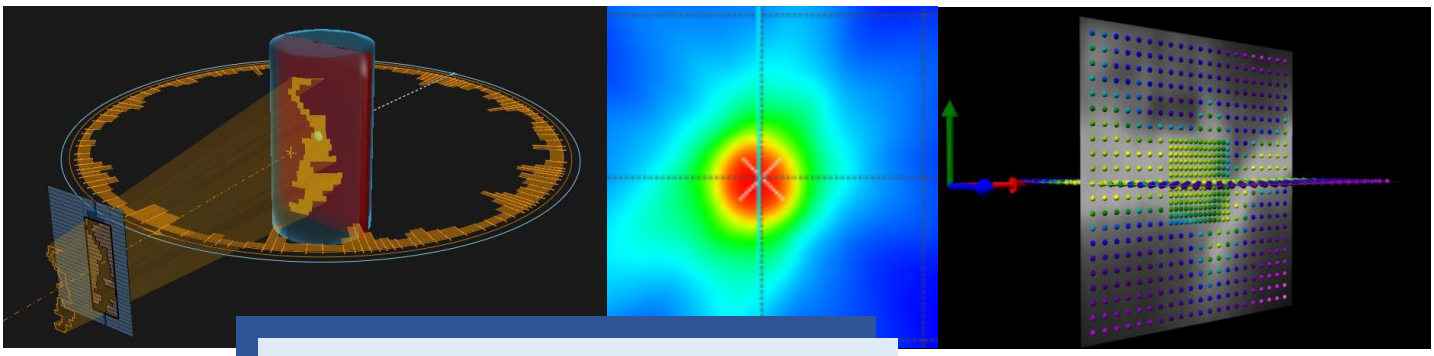
Project 9 in scope of UPLIFT-Project: Quality assurance workflow and dosimetry

Patient specific quality assurance (PSQA) is an essential part of the radiotherapy workflow for both particles and photons, aiming to validate the agreement between the planned and real dose distribution. This validation can be performed either by an empirical measurement of each individual treatment plan or by a recalculation of the relevant dose distribution with an independent software. Both approaches are currently well-established for a treatment in recumbent position. The adaptation to a treatment delivery in upright position is needed. Moreover, as the treatment and therefore positioning of the patient upright is a paradigm shift with very limited experience and with lack of clinical data on positioning accuracy, the PSQA program must be able to verify the positioning precision in all directions including a chair rotation.

The aim of the project is to develop a PSQA procedure for a verification of safe treatment plan delivery for a patient in upright position during photon and particle radiotherapy. Two strategies will be developed: one for both imaging for treatment planning and treatment delivery itself performed in upright position; second one for treatment planning imaging performed recumbent and treatment delivery upright. The developed PSQA will validate the accuracy of the coordinate transfer and dose delivery.

The first essential step will be a systematic analysis of what needs to be validated and how, followed by a concept proposal and a definition of guidelines for PSQA based on measurements and independent dose calculation. Afterwards, a novel QA phantom will be designed enabling simultaneous evaluation of dosimetric and positioning accuracy. A potential outline of such a device is a chair-mounted rotational phantom with an integrated commercial detector, controlled by a user interface that will move the phantom and analyse the acquired data. The last step will consist of an adaptation of an open-source software for an independent dose calculation to enable recalculation of the treatment plans planned on the upright 3D imaging.

The work will be done in close collaboration with ESR10 focusing on software developments.



PhD Student (f/m/d)

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Institute description

Czech Technical University in Prague is one of the oldest technical universities in the world with a tradition of outstanding achievements and academic reputation. It is the top technical university in the CEE region. Its Faculty of Nuclear Sciences and Physical Engineering offers a broad range of study fields and unique nuclear science disciplines. The medical physics programme at the Department of Dosimetry and Application of Ionizing Radiation has a long-standing tradition and the department is the main national institute delivering medical physics education.

Required qualifications:

- MSc or equivalent degree in physics, computer science, biomedical engineering or similar
- Good communication skills relevant for working in a multidisciplinary research group
- Solid Python programming skills
- Research interest and ambitions for excellence in medical physics
- Fluent English (oral and written)
- Analytical skills and ability to work independently on a project basis

General project information:

- Start of the project: July 2025
- Place of work: Faculty of Nuclear Sciences and Physical Engineering, Břehová 7, Praha
- More information on selection procedure: https://uplift-project.eu/
- Mobility rule of MSCA DN applies (Researchers must not have resided or carried out their main activity. i.e. work, studies, etc., in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before their date of recruitment.)
- UPLIFT project is funded by the European Union under Grant Agreement No. 101168955.

For more information contact Petra Trnková (petra.trnkova@fjfi.cvut.cz)