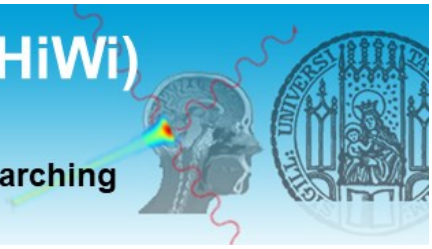
LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Graduate Assistant (HiWi)

at the

Chair of Medical Physics (LS Parodi), Garching



System Integration of the SIRMIO Project

The project SIRMIO (Small Animal Proton Irradiator for Research in Molecular Image-guided Radiation-Oncology) [1] aims at realizing and demonstrating an innovative portable prototype system for precision image-guided small animal proton irradiation, suitable for installation at existing clinical treatment facilities. The proposed design combines precise dose application with in situ multi-modal anatomical image guidance and in vivo verification of the actual treatment delivery.

The SIRMIO platform includes an active beamline to modulate, collimate and focus a clinical proton beam, a beam quality assurance (QA) system, a positron emission tomography (PET) scanner, an ultrasound system, a proton imaging system, and a device aiming at a precise placement of the small animal with respect to the beam. Furthermore, an advanced treatment planning system (TPS) is also a vital part of this setup. All these components use motorized stages and alignment devices to achieve SIRMIO's ultimate goal: precision image-guided small animal proton irradiation.

This platform is now at a critical stage of development, where a comprehensive integration of the different hardware and software components is required. Such integration needs to take into consideration the irradiation workflow in which a plan is calculated on the TPS based on the proton imaging and then delivered. Accurate and precise positioning of all moving components to transport the beam for the energies considered in the plan, and the placement of the animal for irradiation is crucial. Furthermore, the QA system must be prepared before irradiation to monitor the delivery of each plan. The applicant will work on the system integration of all these components and on addressing the data workflow between components, including high throughput data acquisition and storage. This project relies on high-level computational solutions and the applicant should be willing to deal with challenging and complex system integration and irradiation workflow scenarios. Different components use different programming approaches and they must reliably and efficiently communicate with each other. The applicant should also develop a user interface allowing for seamless and prompt utilization of the SIRMIO platform.

We seek a highly motivated applicant with the following background or with the willingness to quickly learn to an advanced level:

- System integration
- C/C++ and python
- LabVIEW
- SQL
- Network and communication protocols, client-server model
- Medical imaging standards

If you are highly motivated to work at the forefront of system integration in the context of an innovative medical physics application in a dynamic and challenging project with high international visibility, then you are encouraged to apply to join our team.

[1] https://www.med.physik.uni-muenchen.de/research/3rd_party_funds/sirmio/index.html
[2] K. Parodi et al., Towards a novel small animal proton irradiation platform: the SIRMIO project, Acta Oncologica 58, 1470-1475 (2019).
Link: https://www.tandfonline.com/doi/full/10.1080/0284186X.2019.1630752

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