



PhD position available in
Medical Physics in Radiation Therapy

Topic: Combined Proton-Photon radiotherapy

Prof. Dr. Jan Unkelbach

Department of Radiation Oncology
University Hospital Zürich
Rämistrasse 100
CH-8091 Zürich

Email: jan.unkelbach@usz.ch

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Proton radiotherapy for treating cancer patients is widely considered a superior form of radiotherapy compared to conventional treatments using high energy X-rays. This is due to the proton depth dose curve, which exhibits a Bragg peak. As a rule of thumb, protons allow for an integral dose reduction in healthy tissues by a factor of 2-3. However, proton therapy is more costly and less widely available. Currently, less than 100 proton therapy facilities are in operation worldwide, compared to more than 10'000 conventional X-ray radiotherapy units. Consequently, only a small number of patients can be treated with protons. In this project, we investigate combined proton-photon treatments, in which one part of the treatment is delivered with protons and the rest with X-rays. As such, this project will develop novel radiotherapy treatment planning algorithms that simultaneously optimize the combination of proton and X-ray treatments. The hypothesis of this project is that optimal combinations can best exploit the advantages of protons and X-rays, and thereby lead to improved radiotherapy treatments at the level of individual patients, as well as the population of patients as a whole.

We are looking for a PhD candidate with a strong background in physics, computer science, applied mathematics, engineering, or a related field. Applicants should have a genuine interest in applying mathematical methods to practical problems in medicine. Experience and interest in scientific programming is mandatory; knowledge in medical physics, radiotherapy, or mathematical optimization is beneficial.

Zürich offers an attractive environment for medical physics research including diverse research groups at the University of Zürich UZH, ETH, and the University Hospital USZ. The PhD candidate will be enrolled at the science faculty at the University of Zürich UZH and will work in the radiation oncology department at the University Hospital USZ. The position is part of a collaboration between USZ and the proton therapy center at Paul-Scherer Institute (PSI) and close interaction between the research groups is given.

Please contact Jan Unkelbach to apply or to obtain further information.