



Dr Yibao Zhang, Peking University Cancer Hospital & Institute, Beijing Cancer Hospital, Beijing, China

Host Institution: Yale University, New Haven, United States

Big data driven decision support system for precision radiotherapy

Abstract

Over 50% of cancer patients receive radiotherapy alone or combined with other therapies during their comprehensive treatment. As a typical interdisciplinary major, it is a Chinese and global legal precondition for the clinical practice of radiotherapy to have qualified medical physicists with backgrounds of both biomedicine and nuclear physics. The applicant focuses on 3 aspects in UICC project.

1. Clinical training

Although many Chinese hospitals are equipped with imported advanced radiotherapy systems, the accessibility of high-quality radiotherapy has been limited due to unique national conditions such as huge patient volume, complex backgrounds of practitioners, imperfect legal and administrative systems, etc. By observing at Yale, the applicant aims to learn and adopt the good experience of quality assurance and administrative structure, which is also part of the research preparation.

2. Research collaboration

Based on 10 years' collaboration experiences and the ongoing projects in common, the UICC fellowship research will apply the machine learning techniques to clinical radiation oncology and medical physics, aiming to establish prediction models connecting patient outcomes with multi-modality data generated during radiotherapy, such as images, treatment plans, dose verifications, etc. The expected results can be applied to assist personalized and quantified decision making supporting precise radiation oncology. This research topic is designed to overcome the limitation of 1 month visiting, which is usually too short for a productive research. During the 1 month, the applicant will focus on the methodological training and data preparation, assuring the research can be continued in China afterwards. More joint grant applications are expected based on this research basis.

3. Prospective educational opportunities

According to Chinese Journal of Radiation Oncology, the insufficient number and varied quality of medical physicists are the major factor undermining the clinical outcomes, patient safety, and original innovation in core technologies in China. As the deputy dean at department of radiation oncology, the applicant plans to learn the advanced training system of medical physics at Yale. As the applicant's joint supervisor during his Ph.D. training, the host professor will supervise one of the applicant's M.Sc. students for a year from 2020-2021. The overlapping one month with the applicant's UICC program will facilitate a teamwork, as well as mark a beginning of educational collaboration on Medical Physics. More students and junior faculties are expected to visit Yale in the future.