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Press release

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Contests / awards, Personnel announcements
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Two young researchers receive Christoph Schmelzer Award 2020

This year, the Christoph Schmelzer Award goes to two young female scientists: The medical physicist Dr. Alina Bendinger from the German Cancer Research Center DKFZ Heidelberg and the engineer Dr. Giorgia Meschini from the biomedical department of the State Polytechnic University in Milan (Politecnico di Milano) receive the prize in recognition of their doctoral theses. With this award, the Association for the Promotion of Tumor Therapy with Heavy Ions e.V. annually honors outstanding master's and doctoral theses in the field of tumor therapy with ion beams.

In her dissertation at DKFZ Heidelberg, Dr. Alina Bendinger established various imaging techniques to characterize the oxygenation status in experimental tumors and to quantify their response to irradiation with carbon ions in comparison to photons. The oxygen supply of tumors is of great importance, since an oxygen deficiency, which often prevails in tumors, makes the cancer resistant to radiation therapy. Dr. Bendinger has contributed decisive methodological improvements. For example, she has extended the evaluation of photoacoustic imaging from a two-dimensional to a three-dimensional procedure. This allows a substantially improved characterization of the heterogeneity of oxygen supply in tumors. In addition, she has developed a new method to improve the dynamic, contrast-agent-enhanced magnetic resonance imaging and validated it with extensive simulations. The results obtained with the new imaging methods have also been validated by extensive histological examinations.

In her doctoral thesis, Dr. Giorgia Meschini has developed sophisticated, model-based strategies for the analysis of respiration-induced movements in particle therapy. These movements can lead to undesired distortions of the dose distribution, which need to be taken into account in treatment planning and compensated by appropriate mitigation procedures. For this purpose, Dr. Meschini used the time-resolved 4D magnetic resonance imaging (4D-MRI) method to convert movement information into virtual 4D computed tomography (4D-CT) data using a special procedure. The 4D-CT is the basis for the precise determination of the range of ion beams inside the body during the various phases of respiration or movement. Furthermore, she has developed modeling approaches that allow the estimation of respiratory movements even at times that are not explicitly captured by the imaging procedures. This allows in particular the analysis of irregular respiratory processes. Finally, Dr. Meschini used these approaches to investigate the effects of respiratory movement on dose distribution and proposed an improved definition of the target volume, which leads to a greater robustness of irradiation plans with respect to movement artifacts.

The prize money is 1500 Euro each. The promotion of young scientists in the field of tumor therapy with ion beams has meanwhile been continuing for many years, and the award, named after Professor Christoph Schmelzer, the co-founder and first Scientific Director of GSI, was presented for the 22nd time. The topics of the award-winning theses are of fundamental importance for the further development of ion beam therapy and often find their way into clinical application.

The Association for the Promotion of Tumor Therapy supports research activities in the field of tumor therapy with heavy ions with the aim of improving the treatment of tumors and making it available to general patient care. At the accelerator facility at GSI, more than 400 patients with tumors in the head and neck area were treated with ion beams

as part of a pilot project from 1997 to 2008. The cure rates of this method are sometimes over 90 percent and the side effects are very low. The success of the pilot project led to the establishment of clinical ion beam therapy centers in Heidelberg and Marburg, where patients are now regularly treated with heavy ions.

URL for press release: http://www.gsi.de/en/researchaccelerators/research_an_overview/ion_beam_radiotherapy_in_the_fight_against_cancer/foerderverein_tumortherapie.htm Association for the Promotion of Tumor Therapy with Heavy Ions e.V.

The winners of the Christoph Schmelzer Award, Dr. Alina Bendinger (left) and Dr. Giorgia Meschini.
Photos: private (left) / Giovanna Menè (right)