Postdoc

to develop INSTantaneous treatment plan Optimization for RADiotherapy (INSTORAD) using artificial intelligence

36 hours per week

Job description

The Erasmus MC Cancer Institute is searching for a postdoctoral researcher to develop and investigate advanced tools for instantaneous treatment plan generation for cancer patients using deep learning (INSTORAD project). Radiotherapy for a cancer patient requires development of a treatment plan, defining the individualized treatment unit settings that result in a favorable dose distribution in the patient, balancing probability of cure versus development of radiation-induced complications. Currently, treatment plan generation is an inefficient time-consuming and fragmented process. This may result in suboptimal treatment plan quality, i.e. the patient could have received a better treatment. With instantaneous treatment plan generation available, the workflow becomes more efficient, different trade-offs between cure and complications can be readily explored as well as other treatment options, thereby further personalizing the treatment. In addition, this process can also shorten patient waiting time before commence of treatment.

To enable such change in clinical practice, plans with high-quality dose distributions should be generated instantaneously. The department is a world leader in the field of automated generation of highest quality plans using mathematical optimization approaches. For the required high-speed plan generation in INSTORAD, deep learning networks will be trained using our in-house optimization tools. As a postdoc you will investigate options of using deep learning approaches to accurately and fastly generate highest quality plans. Tools will be developed for clinical application of the deep learning plans, and the systems will be validated for clinical use. Both treatments with photon (X-ray) beams and protons beams will be investigated.

The research will be performed in a multi-disciplinary team with physicists, mathematicians and clinicians from Erasmus MC, with active collaborations with the University of Texas, Southwestern Medical Center in Dallas, and the Institute of Cancer Research in London. The INSTORAD project is embedded in the postgraduate school of Molecular Medicine of the Erasmus University. As a post-doc, you will actively participate in the design, analysis, and pre-clinical validation of the INSTORAD project. You will collaborate with other researchers of different backgrounds in the department, and supervise PhD and MSc students.

Work environment

The Department of Radiotherapy of the Erasmus MC Cancer Institute is one of the largest Radiotherapy departments in Europe. On a yearly basis, more than 5.500 patients are treated for mainly oncological diseases. The department has an extensive and renowned research program in the field of automated treatment plan optimization, high-precision adaptive radiotherapy, robotic radiotherapy, molecular radiobiology, hyperthermia, and proton therapy. It has a large division of Medical Physics to lead and support physics, mathematics and computer science aspects of research projects.

Qualifications and skills

The selected postdoc has a Master degree in artificial intelligence, (computational) physics, (applied) mathematics, operational research, or a related discipline, and a PhD degree with relevance for the INSTORAD project. You have experience in software development (Python/Matlab) as well as expertise in deep learning model development (e.g. TensorFlow, PyTorch). You have affinity with supervision of students and preferentially with writing grant proposals.

You also have a practical, result-driven working attitude and are an excellent team player. Good academic writing and presentation skills in English are required as well. Being able to present a certificate of good conduct is a condition for the appointment.

Before you apply please check our [conditions for employment](#).

Terms of employment

- The gross monthly salary amounts a maximum of € 4.615,- (scale 10), depending on your level of education and relevant experience and based on a full-time working week of 36 hours.
- Excellent fringe benefits, such as a 13th month that is already paid out in November and a individual travel expense package.
- Pension insurance with ABP. We take care of approximately 2/3 of the monthly contribution.
- Special benefits, such as a in company physiotherapist and bicycle repairer. And there is also a gym where you can work on your fitness after work.

Information and application
For more information about this position, please contact Dr. Sebastiaan Breedveld, assistant professor, email: s.breedveld@erasmusmc.nl

If you are excited by the thought of this position and would like to apply, please do so by using the application form on our website.