PhD Student (f/m/d) Development and Evaluation of PET Image Reconstruction Methods for Simultaneous Clinical Dual-Tracer PET Imaging

With cutting-edge research in the fields of ENERGY, HEALTH and MATTER, around 1,500 employees from more than 70 nations at Helmholtz-Zentrum Dresden-Rossendorf (HZDR) are committed to mastering the great challenges facing society today.

At the Institute of Radiopharmaceutical Cancer Research scientists (f/m/d) from the fields of physics, chemistry, biology, pharmacy, immunology, medicine and IT develop innovative radiopharmaceuticals and novel tools for functional characterization, improved imaging and personalized treatment of tumors.

The Department of Positron Emission Tomography is looking for a **PhD Student (f/m/d) to work on the Development and Evaluation of PET Image Reconstruction Methods for Simultaneous Clinical Dual-Tracer PET Imaging**.

Positron emission tomography (PET) is a cornerstone of today's cancer diagnosis, treatment planning, and response assessment. By administering specific radiotracers, PET enables the visualization and quantification of distinct physiological processes in the body. However, clinical PET imaging has so far been largely limited to imaging the distribution of a single radiotracer per scan. In collaboration with the Forschungszentrum Jülich, the PET department at HZDR has launched a joint research project to evaluate the potential of dual-tracer PET imaging. This innovative approach enables separation of two simultaneously acquired radiotracers, providing two distinct images from a single PET acquisition. Within this project, we will jointly develop, adapt and implement advanced image reconstruction algorithms in our in-house reconstruction software to evaluate the feasibility of dual-tracer imaging on clinical PET scanners – with the ultimate goal of translating this novel method towards clinical application.

Recruitment is subject to final approval by the project sponsor.

Your tasks

- Development of dual-tracer PET imaging methods and reconstruction algorithms in close collaboration with our scientific and clinical partners
- Implementation, evaluation and finalization of the foundations of dual-tracer imaging using a GATE-based Monte Carlo simulation

- Implementation of the developed algorithms within our modular, C++-based and cluster optimized PET image reconstruction framework
- Validation of the developed dual-tracer PET imaging methods on clinical PET phantom data
- Collaborating closely with our scientific and clinical project partners throughout all project phases

Your profile

- Excellent Master's or Diploma degree in medical physics, physics, computer science, medical engineering or a closely related field with a strong interest in data science and quantitative medical imaging
- Proficient programming skills in at least one object-oriented language (e.g., C++, Python) and broad understanding of common programming paradigms, including object-oriented design, template programming, and multithreaded development
- Experience with statistical computing environments such as R or MATLAB is essential
- Knowledge of Monte Carlo simulation methods using the Geant4 framework, medical image reconstruction principles and experience with high-performance computer simulations in physics would be beneficial
- Experience in working with medical imaging data, especially with PET, and experience in data science are desirable
- Excellent teamwork and communication skills in an interdisciplinary research environment
- Motivation and self-discipline to carry out research independently
- Excellent command of spoken and written English

Our offer

- A vibrant research community in an open, diverse and international work environment
- Scientific excellence and extensive professional networking opportunities
- A structured PhD program with a comprehensive range of continuing education and networking opportunities - more information about the PhD program at the HZDR can be found here
- Salary and social benefits in accordance with the collective agreement for the public sector (TVöD-Bund) including 30 days of paid holiday leave, company pension scheme (VBL)

- We support a good work-life balance with the possibility of part-time employment, mobile working and flexible working hours
- Numerous company health management offerings
- Employee discounts with well-known providers via the platform Corporate Benefits
- An employer subsidy for the "Deutschland-Ticket Jobticket"

We look forward to receiving your application documents (including cover letter, CV, diplomas/transcripts, etc.), which you can submit via our online-application-system.

Contact Information

Please send your complete application documents (cover letter, CV, and relevant certificates) including your earliest possible start date and salary expectations to:

Prof. Dr. Anja Braune

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