

PHD STUDENT

DATA SCIENCE & AI

RADIOPHYSICS AND MRI PHYSICS LABORATORY— UNIVERSITÉ LIBRE DE BRUXELLES

Optimisation of pancreatic ductal adenocarcinoma treatment through the application of multimodal data and advanced Artificial Intelligence methods

Job description

We are seeking a highly motivated candidate with a Master degree in Computer Science, Civil (ideally Biomedical) Engineering, Medical Physics, or equivalent, to conduct research in an ambitious Data Science project titled: “Optimisation of pancreatic ductal adenocarcinoma treatment through the application of multimodal data and advanced Artificial Intelligence methods”. The proposal will focus on all aspects of data science; from supporting the creation of structured databases to the development and validation of multi-modal (including imaging) data analysis pipelines using machine- and deep learning. The project will be carried out on ULB's ERASME campus (Anderlecht, Brussels) in the Data Science & AI Research Unit of the Institut Jules Bordet (the Belgian reference centre for cancer treatment), in strong collaboration with the Laboratory of Experimental Gastroenterology and the Department of Pathology.

Project description

Pancreatic ductal adenocarcinoma (PDAC) is the most common and aggressive type of pancreatic cancer. It arises from the cells lining the ducts of the pancreas and accounts for the vast majority of pancreatic tumors. In Belgium, PDAC causes nearly 1,700 deaths each year, making it the fourth leading cause of cancer-related death. Due to its aggressive nature, late diagnosis, and resistance to therapy, PDAC is projected to become the second most deadly cancer by 2030.

The overall prognosis for PDAC remains very poor, with fewer than 12% of patients surviving more than five years after diagnosis. This is largely due to the fact that most patients are diagnosed at an advanced stage, when the disease has already spread locally or to distant organs.

At HUB, a unique, comprehensive and multimodal database of PDAC samples has been collected and fully annotated with clinical and pathological data. In addition, samples from patients enrolled in clinical trials are being prospectively obtained.

This PhD project will focus on the development of interpretable AI models that integrate multimodal data—including histopathology, radiology, transcriptomics, and clinical variables—from a unique cohort of several hundred PDAC patients to identify predictive biomarkers and therapeutic response signatures. By applying the latest AI technology, including large-scale foundation models, the goal is to

uncover latent patterns linked to molecular subtypes, treatment resistance and patient outcomes. The candidate will work closely with clinical and translational collaborators to ensure clinical relevance and to build models capable of guiding personalized treatment decisions. This research has the potential to transform PDAC care by enabling data-driven stratification strategies and uncovering mechanistic insights into therapy resistance and tumor evolution.

Further information on the project can be obtained by contacting: Dr. Ir. Jennifer Dhont (ULB / Institut Jules Bordet) - jennifer.dhont@hubruxelles.be, Senior Data Scientist, Institut Jules Bordet.

Profile

We are looking for a highly motivated, pro-active and creative PhD student who can work in a multidisciplinary environment composed of physicists, computer scientists, data scientists and physicians. The candidate must be able to work independently, as well as demonstrate a strong commitment to the team and have good organizational skills to manage the (international and interdisciplinary) collaborations in this project. The ideal candidate should:

- Hold a Master of Science or Engineering degree in one of following disciplines: Computer Science, Physics, Biomedical Engineering, Medical Physics or equivalent;
- Have demonstrated coding skills (Python, MATLAB or other);
- Show proof of proficiency in English, both in oral and written communication;
- Be a team player who can work autonomously and who is able to meet deadlines;
- Be willing to spend part of her/his time abroad for research activities and participation in workshops and conferences;
- Be willing to step out of their comfort zone by learning concepts outside of their initial scientific background (medical oncology, data science);
- Experience in - or knowledge of - bioinformatics will be viewed as a significant advantage;
- Experience with a deep learning framework (Tensorflow, PyTorch) is a plus;
- A good knowledge of data science, medical image analysis or other omics analysis will be considered as an asset.

While some flexibility is possible, we expect team members to be on-site at least 80% of the time during the first year to support collaboration and knowledge sharing.

Application procedure

The position is for an initial duration of two years, renewable once (max: 48 months in total). The project will start October 1st 2025. Soon to be graduating master students are welcome to apply provided that they will have graduated before the start of the position. The candidates already in possession of a PhD are not eligible. The applicant should provide a motivation letter, curriculum vitae, a summary of previous research work / master thesis and the name and e-mail addresses of two reference persons by e-mail to Dr. Ir. Jennifer Dhont (Jennifer.dhont@hubruxelles.be) by **September 1st 2025** at the latest. Selected candidates will then be interviewed in the following weeks.